

# CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

FEBRUARY 1, 1996

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SPECIAL ISSUE

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# CIO

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#### Mining for Gold

This year's Enterprise Value Award winners have extracted real value from challenging conditions. They have helped their organizations adapt to significant changes in their industries and markets—and garnered some pretty impressive financial returns in the process.



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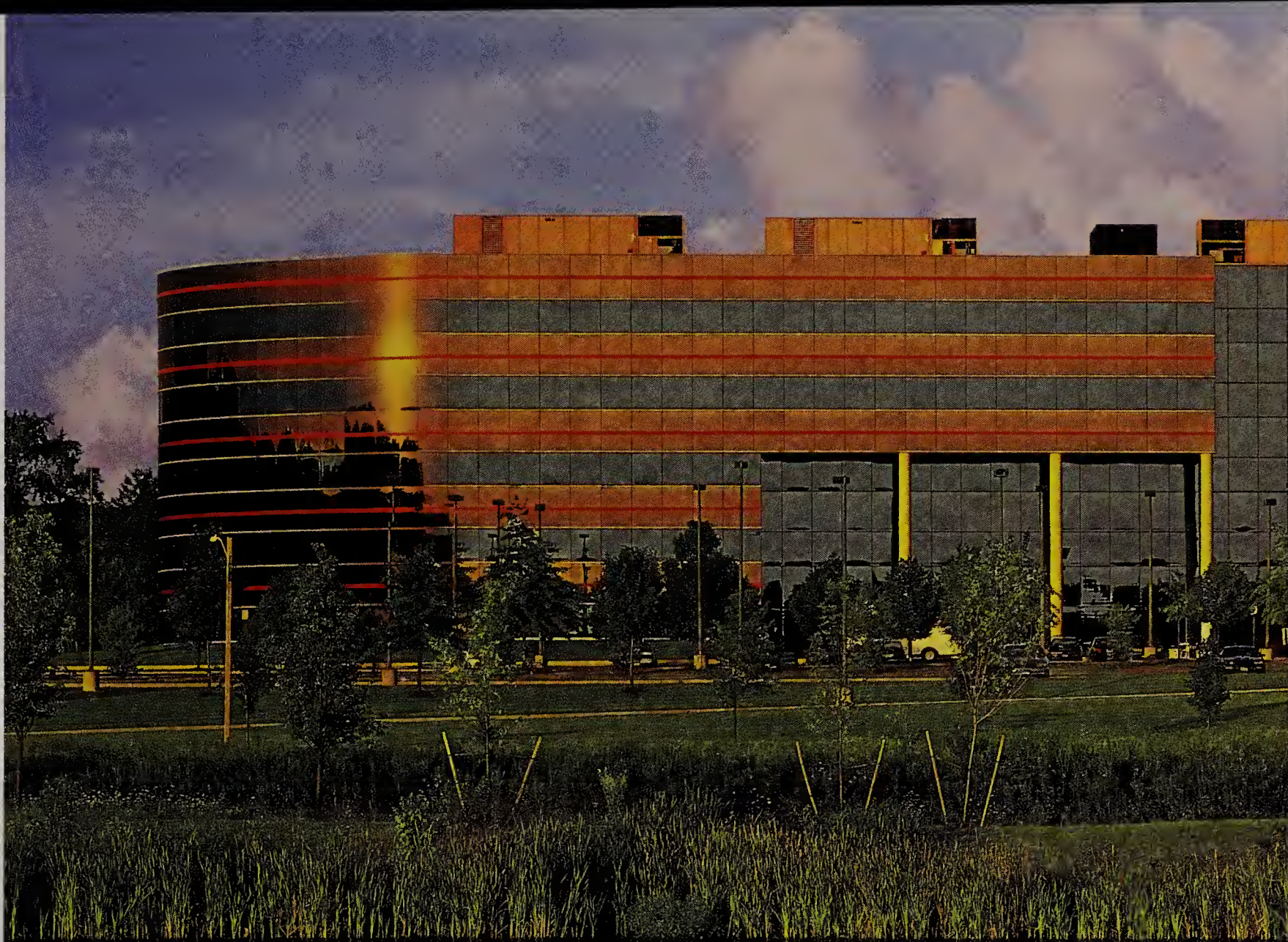
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# Five-floor connector with river view.

Connector? Don't we mean building? Because to most people, connectors are pieces of plastic and metal that go on circuit boards or the ends of cables. And while people do associate AMP with connectors, they don't associate us with buildings. Well, we're out to change that. First, we're broadening our definition of connectors. For example, we see today's modern office buildings as connectors, viewing them as networks of technology and cabling that act to keep people and information connected. Second, this broader definition of connectors has led us to broaden the capabilities of our company. We've added technologies like network cabling, computer interface cards, hubs, routers, fiber optics, and wireless components. And third, we bring these technologies together to give our customers a network cabling system with greater connectivity, higher bandwidths, lower maintenance costs, and a longer useful life. So while most people looking at a building wouldn't see a connector, our customers benefit because we do.

Connecting  
at a  
**HIGHER**  
level.



In this special issue of *CIO*, we honor the six organizations that received our 1995 Enterprise Value Awards. Since its inception, the *CIO* awards program has had one purpose: to recognize the people who develop IT applications that contribute strategic value and hard-dollar benefits to a public or private company, government agency or nonprofit organization. This year's recipients represent the health-care, aerospace, defense, electronics and software industries.

Partnerships forged between vast departments are, in the end, usually sustained by the dogged perseverance and extraordinary effort of a few courageous individuals joined in common purpose.

It is fitting, then, that the Enterprise Value Award is presented to one technology executive and one business executive at each winning organization. Together, these executives accomplished what neither could do individually: They envisioned, championed and crafted a strategic IT solution to enhance business value.

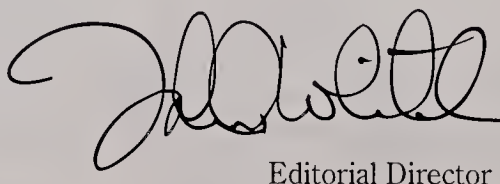
Here are some of the extraordinary feats our winners accomplished.

At Rockwell International's \$1.3 billion space systems division, Information Management Director K.S. Radhakrishnan and General Manager R.M. Glaysher collaborated to replace the company's paper-based document filing warehouses with a multisite, custom-written document storage and retrieval system (DSRS).

The system not only made more than 1 million space shuttle engineering, manufacturing and assembly drawings available to engineers on their desktops, it also saved millions of dollars for Rockwell and its largest customer, NASA. In addition, the Shuttle Drawing System (NASA's application of DSRS) has lopped two weeks off shuttle launch schedules at Kennedy Space Center.

Telogy Inc., a \$100 million company, competes against giants in the electronic test equipment services market. Telogy initiated an enterprisewide reengineering initiative jointly led by CIO Sateesh Lele and CEO Anthony Schiavo, which has resulted in a yearly growth rate of nearly 25 percent and fast, flexible, high-quality customer service. Customer responsiveness led to a 20 percent increase in sales. The order-to-billing cycle was reduced to three days from 11. On-time delivery performance rose to 85 percent from 66 percent. And within one month, the company launched a leasing card for its customers that generated 9 percent more leasing revenue by simplifying credit approval and order processing.

Congratulations to these and all of our winners. Look for applications and information about the 1996 Enterprise Value Awards in an upcoming issue of *CIO*.

  
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**Subscriber Services** (800) 788-4605, FAX (508) 872-0618  
**List Services** (800) 859-LIST  
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the time it takes to learn, the money that it  
takes to train, the elusive reuse benefits, the  
resistance to change, the constantly arising  
trouble spots, the long lead times required  
to build applications from scratch, complex  
low-level programming languages, lack of  
scalability, the shortage of talent, limited  
platform support, the performance penalties,  
deployment challenges, heavy maintenance,  
difficulty in comprehension, and the expense  
of manually reapplying your customization,  
object technology is quite beneficial.

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Four years ago, we set out to recognize CIOs and their business partners who, through collaboration and innovation, have demonstrated return on investment (ROI) derived from the implementation of information technology. Business value comes in many flavors, and along the way we realized that traditional ROI metrics fail to measure the total value a system can deliver. As a result, our Enterprise Value Awards take into consideration more than just bottom-line ROI.

Last week, we honored the recipients of the 1995 Enterprise Value Awards at the CIO Enterprise Value Retreat in Phoenix.

Although we recognized those who envisioned and implemented innovative system solutions, I would now like to pay tribute to the companies that supplied the technology.

At the end of each Enterprise Value Award article, you will find a box of information detailing the hardware, software, networking and architecture of each winning system. These technology vendors represent the backbone of the Enterprise Value Awards. It is their innovative products and services that enable organizations like Gensym Corp. and United HealthCare Corp. to create their winning systems.

The Enterprise Value Awards recognize collaboration for business value. I'd like to think that this collaboration is not just between the CIO and the business unit but also the partnership between a company and its technology vendor. So, congratulations to both the winning companies and their vendor partners.

*Wayne L. Levy*

P.S. Be sure to join us March 17-20 at the CIO Perspectives spring conference, "The CIO and Cyberspace: The Business/Technology Intersection," in Naples, Fla. We will explore the executive's role in Web/Internet corporate initiatives. For more information, call 800 366-0246.

# Coming In CIO

## Wild Brew Yonder

Having soaked up 56 percent of a saturated domestic market, Belgian brewing giant Interbrew is pursuing a global expansion strategy that includes brewery acquisitions, equity stakes and licensing agreements with foreign brewers. That means a worldwide IT plan to spread technology resources where they are lacking and consolidate and globally manage them where they are too plentiful or redundant. But it also means encountering resistance to international management in what is traditionally a local industry. *CIO's* European Spotlight looks at how Interbrew is instituting centralized management of scattered operations, streamlining operating expenses, balancing cultural differences, implementing experienced staff in technology-deficient countries—and taking its time doing it.

## On The Fast Track

Climbing revenues, greater profit margins, a larger share of the market and mergers among the largest carriers have girded the railroad industry for battle in the fiercely competitive intermodal shipping arena. What's next? As companies increasingly demand quick, reliable and flexible service, rail carriers will expand strategic alliances with trucking, air and sea carriers to provide seamless, point-to-point freight transportation. *CIO* will explore the importance of intercompany collaboration to the future of the industry.

# Your Worst Nightmare

---

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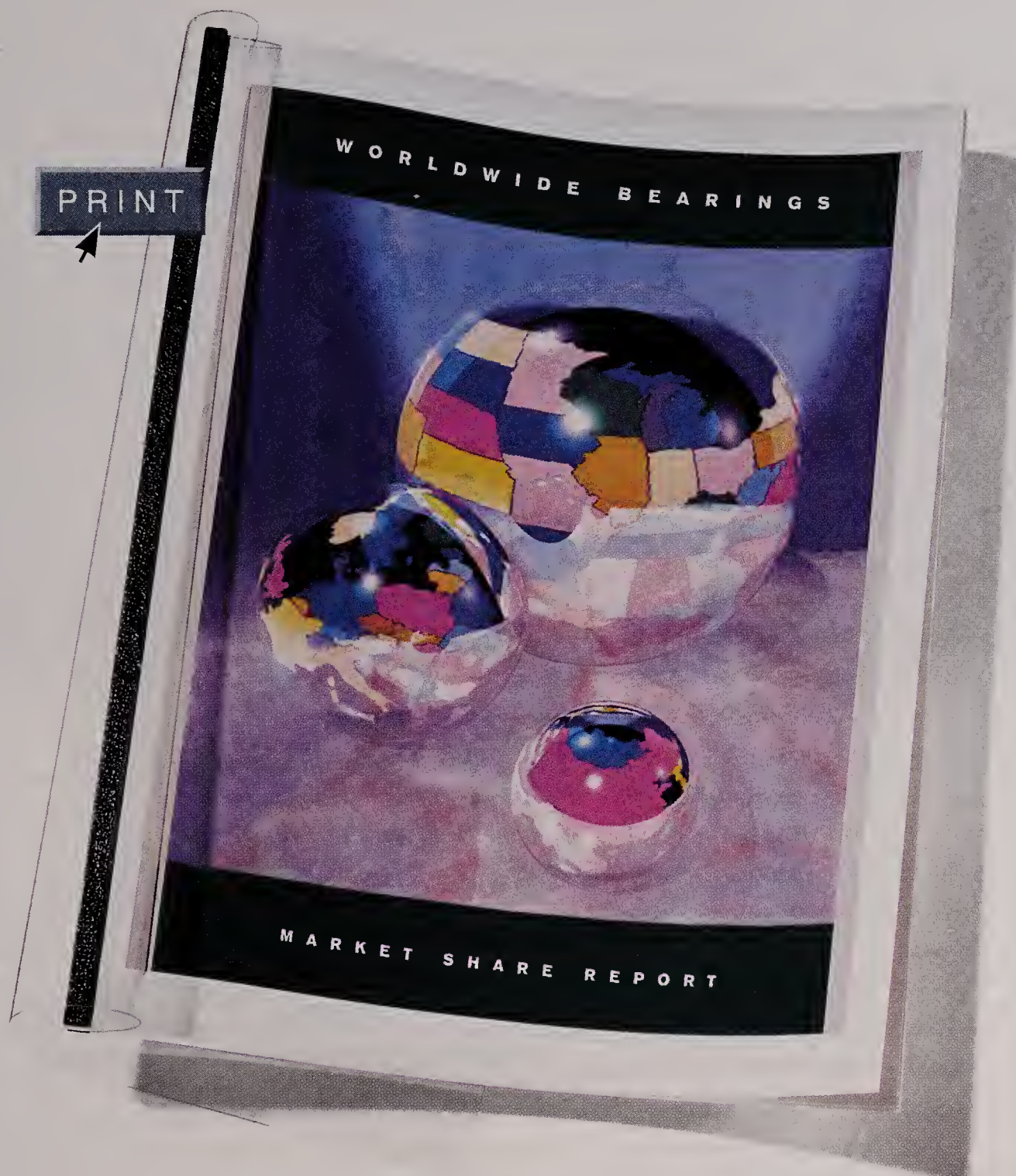
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# TRENDLINES

## DOCUMENT STORAGE

### WHAT'S IN YOUR DATA ATTIC?

**R**emember the last time you sorted the musty boxes stowed in your attic or basement? You probably found that you had squirreled away the darnedest junk. Well, what if you could get sued over that junk and winning the case depended on your ability to locate it quickly?

If you took tips from records managers of some Fortune 500 companies, you wouldn't organize it yourself—you'd hire someone else to clean up the mess.

Faced with mounting storage costs and courts' decreasing tolerance for shoddy records management, many companies are choosing to outsource the storage and tracking of paper documents and electronic media backup. Handing the broom to a vendor can help companies eliminate on-site staff and storage, comply with federal regulations and avoid the devastation of a lawsuit lost over a "smoking gun" document or the company's inability to find a subpoenaed file.

The Chase Manhattan Bank N.A. says outsourcing helped it cut document storage costs from \$1 million to \$900,000 annually and take better control of its information assets. According to John Mitchell, vice president of office services and pur-

chasing, the move also reduced the amount of information sent to storage because the bank began billing individual departments for usage. "Rather than putting their old galoshes and anything else they could cram in into storage, they started making conscious business decisions about what to save," he says.

Successful data-storage outsourcing requires more technology than the average local mom-and-pop warehouse can provide, Mitchell says. Vendors typically use bar-code labels to track boxes of documents and build database indexes for document requests. Some vendors, such as Iron Mountain, which handles Chase's storage, work with clients to adapt data-storage tracking tools to the company's infor-

mation systems.

The most compelling reason for companies to keep their records shipshape (and an area in which outsourcing can provide critical support), is defense against potential lawsuits, says Donald Skupsky, a records management

lawyer and president of the Information Requirements Clearinghouse in Denver. Proper document management can help locate the piece of paper that could win the case and can purge files of unnecessary documents that could become smoking guns; document-retention schedules slate files for destruction once they have been retained long enough to meet federal or state regulations. While companies can develop a document-retention policy without outsourcing, Mitchell says his bank found it "wasn't doing a good job sticking to a schedule on its own."

"We had thousands of cubic feet of useless records we were storing and would have stored until the end of time because we didn't know they were there," he says. "It was like that stuff you put in the basement and forget about."

Whittling down the number of documents stored also saves money during the discovery process. Two years ago, the Supreme Court not

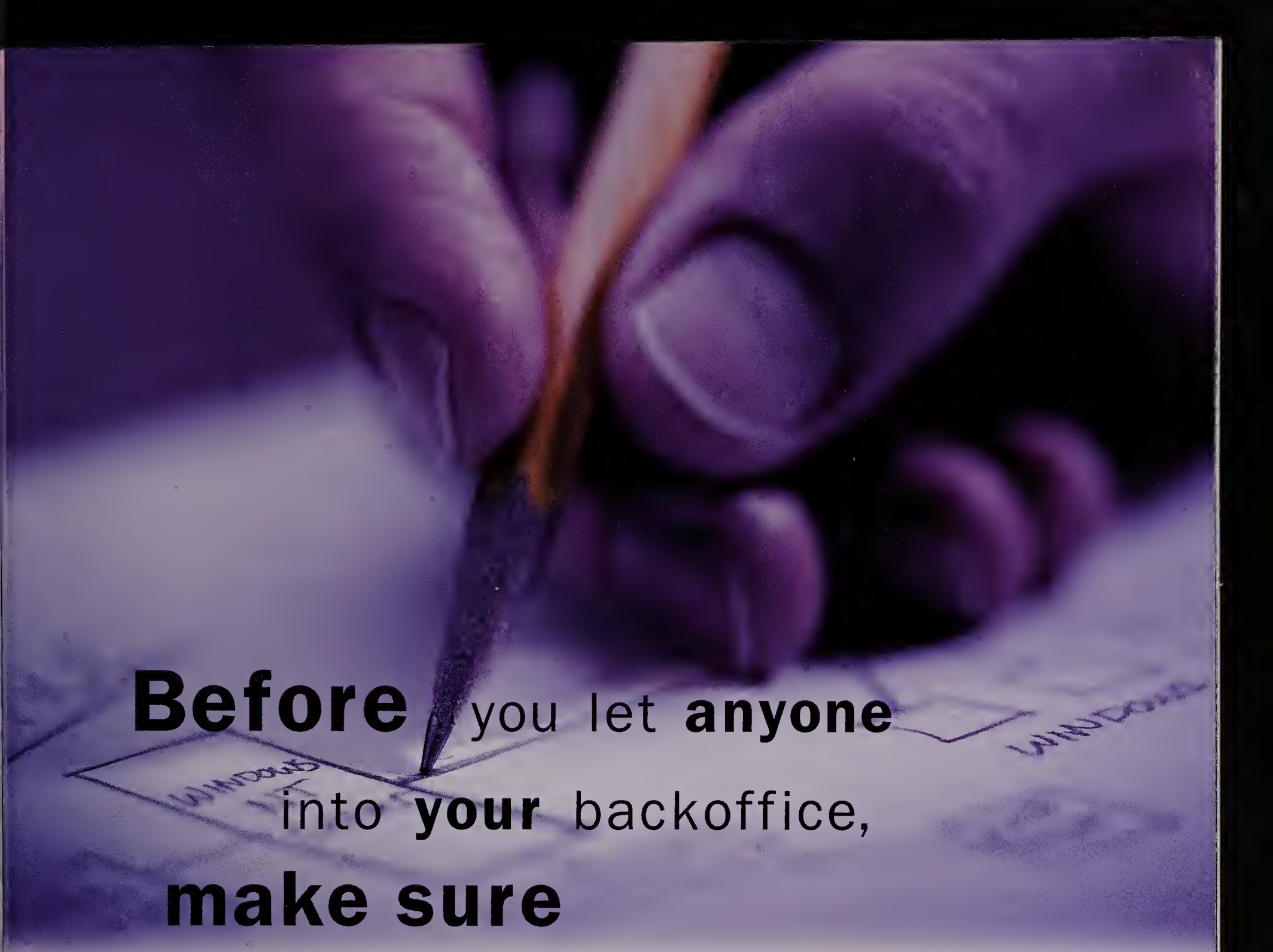


**"I see fewer investments ahead for us in computing and more—a lot more—in communications...."**

**Chief information officers are in a critical role.**

**CIOs who share the language and the vision of the CEO and have a strong link with the business will help the CEO understand the business and organizational risks of new communications technologies."**

**—Bob L. Martin, president and CEO of Wal-Mart Stores' International Division, as quoted in Harvard Business Review, September-October 1995, Page 162**



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# TRENDLINES

only broadened the scope of documents that defendants must make available but ruled that the absence of a records management program is no defense for failing to produce a requested document within about 85 days—an expensive requirement for companies with poorly kept records.

“Regardless of the cost to find the records, you are required to find them,” Skupsky says. “If you can’t find them, you lose. Period. Too bad for you.”

Despite the legal risks, only about half of the Fortune 500 have adequate records management pro-

grams, and fewer than half of those systems are sufficient to help a company successfully defend against a lawsuit, Skupsky estimates.

But as the concept of information as an asset has gained prominence, more records managers and CIOs are taking proactive approaches, which sometimes involve outsourcing.

Mitchell says the decision of whether to outsource begins with tough questions: Do you know what’s in your company’s attic? Are you sure enough to let the company’s assets ride on that answer?

—Cheryl Dahle

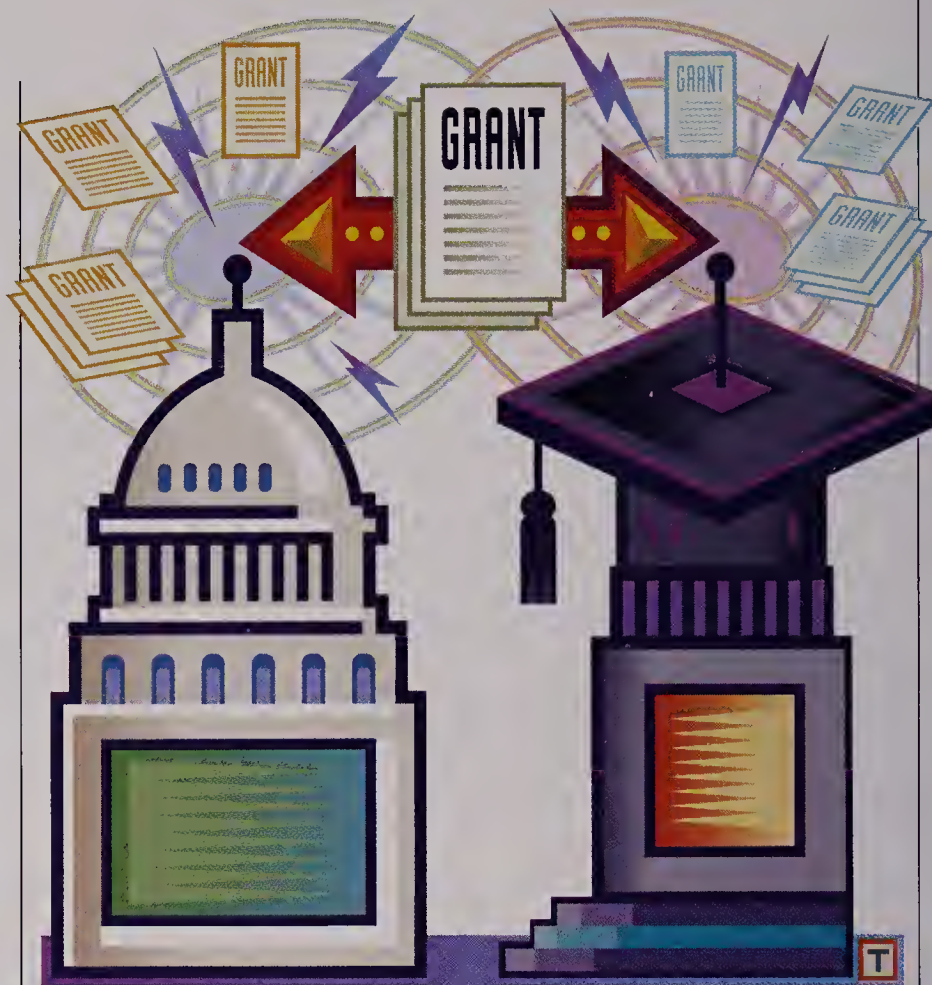


## GUIDING LIGHT

**F**or IS organizations looking to replace the old iron, CompUSA Ads in the daily paper aren’t terribly helpful. Here’s a tip. If you’re thinking about purchasing a computer for home or the office, you can check prices by referring to either *Computer Price Watch* or *Computer Price Guide*.

*Computer Price Watch*, published monthly by Computer Information Resources Inc., offers pricing information on PCs and workstations from IBM Corp., Sun Microsystems Inc., Hewlett-Packard Co., Compaq Computer Corp., Apple Computer Inc. and others. A year’s subscription costs \$110. For more information, call 817 654-0346.

*Computer Price Guide* is a quarterly publication that claims to be “the blue book of used IBM computer prices” on IBM CPUs, peripherals and systems, and personal computers. It is published jointly by Computer Merchants Inc. and Computer Economics Inc. A subscription is \$125 annually; one issue costs \$35. For more information, call 914 592-1060. ■



## GOVERNMENT ONLINE

### RED-TAPE DISPENSER

**I**f a pulp biographer decided to pen the life of a federal grant proposal, it might read something like this: raised by copy machine addicts, spends adolescence wantonly frittering away fortunes, achieves fleeting approval from university critics and is unceremoniously heaped into the FedEx hearse to be buried at some federal agency with all the other fame seekers.

Fed up with the outrageous bills and paperwork that these grant applications generate, a consortium of government agencies and universities is developing a system that will electronically create, submit and track federal grant proposals. Participants in the pilot project have already used the EDI-

based system to successfully transmit via the Internet the administrative forms that accompany applications. Developers are still wrestling with a format for proposal text, which often includes diagrams not compatible with EDI. Pilot universities and institutions will begin transmitting real proposals this fall, according to Federal Information Exchange Inc. (FIE), the company retained by the U.S. Department of Energy to manage the project. Five other federal agencies, including the National Institutes of Health and the Office of Naval Research, are pooling \$700,000 to pay for development.

Despite the headache of reorganizing internal processes to meet the new standards, pilot institutions, such as Duke University and the Fred Hutchinson Cancer Research Center, are eager to realize the savings of the paperless process. One univer-

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# TRENDLINES

sity involved estimated that its costs for photocopying and overnight shipping alone topped \$250,000 in 1993, says John Rodman, president of FIE. That doesn't even begin to account for the cost and hassle of redundant staff efforts.

"That's the thing that drives us absolutely batty," says Robert Killoren, director of sponsored programs at Pennsylvania State University. "You know that the document started as a computer file. But the department prints it out to send it to the college. The college takes that document, retypes it into its system, adds its information to it and then prints it out to send it to us on pa-

per. We take that hard copy and re-enter it into our system. It's an incredible waste of time."

Though some have raised concerns about security and graphic integrity, Killoren says professors and staff members welcome the change. "We're getting back to what we should be doing, which is supporting the faculty and helping them make their proposals more competitive," he says. "We're adding value to the process instead of being just a document checkpoint."

Project Director Robert Unger says benefits from the new system will reach beyond researchers courting federal dollars: Other federal

efforts to conduct business electronically, such as purchasing, have had little success despite President Clinton's formal request that agencies make every effort to eliminate paper by 1997. Unger says the grant proposal project may provide a model for the transition.

"It's going to mean a whole new way of doing business with the federal government," Unger says.

Of course, unfortunately for kiss-and-tell publishers, the life of the reformed grant proposal would no longer make for good copy—too clean-cut. —Cheryl Dahle



## DAY IN CYBERSPACE

When a photographer goes looking for great visuals, you wouldn't ordinarily think to point him toward someone using a computer. But access to cyberspace is transforming people's lives, hence it is ideal grist for the photojournalist's mill, as the folks behind *24 Hours in Cyberspace* have demonstrated with their Web site at <http://www.Cyber24.com>.

Rick Smolan and the team that created the *A Day in the Life* photography book series and the award-winning CD-ROMs *From Alice to Ocean* and *Passage to Vietnam* have set out to assemble the best (and presumably the most visual) examples of how cyberspace is changing people's lives all over the world. On Feb. 8, more than 1,000 photographers will descend on computer users around the world to photograph them working, learning and playing online. One of the largest photographic projects ever done, *24 Hours in Cyberspace: Painting on the Walls of the Digital Cave* is also one of the largest collaborative Internet projects: The photographs will be transmitted digitally back to project headquarters in San

### A NEW INTERPRETATION

For companies that do business overseas, communication barriers can be a big pain in the cou. Hiring a full-time translator may not be practical; hiring a freelancer is expensive and usually involves time-consuming administrative and accounting procedures. But now companies can

get inexpensive, just-in-time translations with Globalink Inc.'s new Trans-

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Customers access Translate Direct through a free client-version software interface from Globalink. Once logged on, they complete a profile form and enter the file to be translated,

*¡Hola!*

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price and time estimate for translating the file; services range from fast and inexpensive machine translation using Globalink's Barcelona software to more expensive, publication-quality work done by a professional human translator.

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*Bon Jour*

supports Italian, French, German and

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INTERSECTION

MARCH 17-20, 1996 ■ RITZ-CARLTON ■ NAPLES, FLORIDA

risk (see sidebar). And it forces the growth of new organizational structures, a new culture and new leadership styles and new relationships — some alliances, some turf battles — with people both inside and outside the company.

Using cyberspace effectively requires changes at an organization's molecular level. But breaking established patterns of thought and action can be near-impossible, especially when they're embedded in both management styles and IT architecture. It's much easier for most people to try to understand an innovation by comparing it to something old than by thinking of it in terms of something entirely new.

Citing a precedent, Alan Kay, Apple Fellow, Apple Computer, notes that it took years for turn-of-the-century Americans to stop viewing Henry Ford's invention as something other than a "horseless carriage." Of course, "how automobiles resembled horse-drawn carriages is much less interesting than how they differ," Kay points out.

For CIOs and other executives, such uncertainty is likely to prompt questions, challenges and changes involving every aspect of business and technology, often in unclear or even contradictory ways. For instance, IS in "networthy" organizations will be expected to figure out how to make some information more easily accessible to the public while taking even greater precautions to secure data the company wants to keep private.

Even more critical will be the impact on personnel. "No one can really foresee all the changes that are going to happen to workers, organizations or even countries as we move into this cyberspace world," says James C. Wetherbe,

Federal Express Professor of Excellence & Director, Center for Cycle Time Research, University of Memphis. But Wetherbe predicts that, in general, organizations who thrive in the 21st century will be those whose management structures have evolved "from patriarchy to partnership." "It's already happening, and it's going to be happening a lot more," he says.

**"You've got to dive in.  
It's not something  
you can ignore and  
it will go away."**

Fast, open communication plays a critical role in that transformation. "Whenever you change the way you can communicate, you're going to change how most organizations work," Kay says. For instance, e-mail has helped flatten many corporate hierarchies by providing entry-level employees unprecedented direct access to top decision-makers. Traditionally, it was viewed as "an act of warfare if you carbon-copied your boss's boss on paper," Kay says. "But we do it all the time in e-mail." Without repercussions.

Use of internal World Wide Web sites also changes the way organizations work. Established and maintained properly, a workplace Web site can enable everyone in the enterprise to share resources, constantly update information, teach, learn, and keep in touch with colleagues at their home base, remote locations or on the road.

At Sandia, for example, the Web connects most of the 8,500

employees and 2,000 contractors at locations in New Mexico and California. Initially viewed as one way to take the pressure off Sandia's employee e-mail system, the internal Web site has become, in Eaton's words, the organization's "freight hauler." Among other offerings, the Web site includes job postings, conference-room scheduling, a staff phone list, facility maps, training modules, policy and procedure manuals, travel information, in-house publications and "preserved knowledge" — information left for future employees by retiring ones.

The Internet will reshape external relationships as well. "We're in a real period of transition in terms of how we interact with customers, with employees, with vendors, with everybody," Wetherbe says. "The boundaries of what we think of as an organization are going to be greatly blurred."

For instance, he says, while downsizing has rendered obsolete the traditional corporate promise of employment-for-life, people may become more loyal to relationships in electronic communities, such as Internet newsgroups and mailing lists, than those in their current real-world workplaces.

Navigating cyberspace will provide plenty of headaches for CIOs. But for those who can let go of the past, it can provide a unique opportunity to pilot their organization's journey to the future. "It's going to happen with or without your permission," Wetherbe warns CIOs about the Internet's influence on their businesses. "When it happens, you want to facilitate and make it happen to your best advantage."

---

*Anne Stuart is Senior Editor at CIO.  
She can be reached at [astuart@cio.com](mailto:astuart@cio.com).*



## Davenport on Cyberspace: Risking Business

### What's the single biggest mistake CIOs make about cyberspace?

Thomas H. Davenport's answer might surprise you. "They worry too early about security," says Davenport, Director of the Information Systems Management program at the University of Texas in Austin.

Worry too early about security? Isn't that against conventional wisdom, which holds that companies should stay off the Internet and the World Wide Web until they can guarantee that their systems are tamper-proof?

Davenport, a long-time IT consultant, acknowledges that connecting to the Internet does raise legitimate concerns about potential damage or unauthorized access to an organization's systems. But "there are security risks with every technology," he adds. "We'll be waiting for Godot if we say we're not going to get on the Internet until all the security issues are resolved."

Besides, he points out, most security problems aren't caused by technology problems, but by human and behavioral causes. In fact, law enforcement officials say the majority of computer crimes — some estimates set the figure as high as 90 percent — are committed by authorized users. Thus, even leading-edge technologies can fail if they're not backed by clear, diligent and uniform policies.

So if security isn't the single most important thing CIOs need to consider in thinking about the Internet, then what is? Hint: Color it green.

"I think they should have a fundamental sense of how their organization is going to make money using it," Davenport says. For one company, that might be bringing in new business by burnishing the corporate image or offering online order-taking through a Web site. For others, it might be cementing existing relationships by providing newer, faster customer service by e-mail.

In any case, Davenport says, organizations need to develop a high-level strategy about what's needed to ultimately do business on the Internet — and CIOs should contribute to the planning process.

In addition, Davenport says, IS has the opportunity to play a major role in obtaining, organizing and disseminating an organization's "knowledge assets," also known as "intellectual capital." But the effort goes far beyond installing an internal Web site or developing a Lotus Notes database. It may require full-time oversight by a "Chief Knowledge Officer" who may or may not come from IS.

Above all, it means managing knowledge is managing people, making sure that all captured information links to individuals and that everyone in the enterprise knows how to find what they need.

"We've never yet found a technology that by itself would create a better information environment," Davenport says. "I try to say that's not even just the first step."

## Naples' Ritz-Carlton

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**Sunday, March 17**

3:00pm-6:00pm

**Conference Registration**

7:00pm-9:30pm

**Welcome Reception**

9:30pm-12:00am

**Hospitality/Networking**

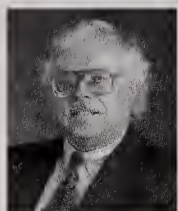
**Monday, March 18**

7:30am-8:15am

**Breakfast**

8:15am-8:20am

**Welcome & Opening Remarks**



Joseph L. Levy  
President & Publisher  
*CIO Communications, Inc.*

8:20am-9:30am

**Rewiring Leadership**



**Conference Moderator**  
Jim Wetherbe, PhD  
Director  
MIS Research Center  
*University of Minnesota*

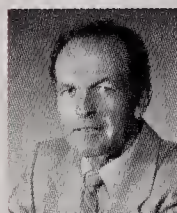
Federal Express Professor of  
Excellence & Director  
Center for Cycle Time Research  
*University of Memphis*

The age-old social contract between boss and subordinate is bankrupt — "Do a good job, work hard and you will have a job for life." It's no longer true, nor will it be likely to be true for the foreseeable future. Loyal hard-working employees are increasingly being

told they are no longer needed, despite lengthy, loyal service. How does a "boss" maintain loyalty and achieve motivation from staff in this new paradigm? How does an organization retain long-time viability when organizational participants no longer view a company's success to be directly linked to their own? This session will examine these and related issues caused by reengineering and downsizing.

9:30am-10:15am

**The CIO as Internal Web Champion:  
Picking the Right Battles**



Michael J. Eaton  
CIO  
*Sandia National Laboratories*

Like many companies, Sandia National Laboratories has realized a key to improving corporate processes is to give the ability to control and manage information directly to managers and staff. Sandia established a vision of information self-service at the desktop and embarked on a three-year, three-stage implementation program, beginning with internally implemented World Wide Web-based (WWW) technology. The WWW presentation layer can be inexpensively obtained for a variety of platforms. When implemented in conjunction with data warehouses, an internal Web provides a compelling environment in which line users can begin to regain control of the information they require for their jobs.

10:15am-10:45am

**Coffee Break**

10:45am-12:00pm

**Cyberlaw and the Web:  
Copyright, Litigation, Trademarks,  
Patents and Deals**



Peter Brown, Esq.  
Managing Partner  
*Brown Raysman  
Millstein LLP*

The cornerstone of any multimedia or Internet development project is the acquisition of intellectual property rights to pre-existing content. In creating a multimedia work, a content provider often combines its own intellectual property with works created by others. The content provider must properly acquire all the necessary rights before it incorporates a work into its product, or it may face potential liability for infringement. This session will cover structuring and negotiating a multimedia agreement, dealing with rights being transferred and rights that are retained, restrictions on the use of the intellectual property, methods for protecting the quality of the goods created, structuring fair payment procedures and current and future technologies.

12:00pm-1:30pm

**Luncheon**

1:30pm-2:15pm

**Webs of Knowledge**



Thomas H. Davenport, PhD  
Curtis Mathes  
Fellowship Professor

Director  
Information Management Program  
College & Graduate School of Business  
*University of Texas at Austin*

Many firms, particularly high-technology companies, are beginning to employ internal versions of the World Wide Web for knowledge management. They are using this technology to capture and distribute key

knowledge throughout the organization. In this presentation, Davenport will report the results from a study of these pioneering firms and their experiences. He will describe the strengths and weaknesses of the Web for knowledge management, along with approaches that must accompany Web use.

**2:15pm-3:00pm**  
**Concurrent Sessions**

**3:00pm-3:30pm**  
**Coffee Break**

**3:30pm-4:15pm**  
**Concurrent Sessions: Repeated**

**6:30pm-7:30pm**  
**Reception**

**7:30pm-9:00pm**  
**Dinner**

**9:00pm-12:00am**  
**Hospitality/Networking**

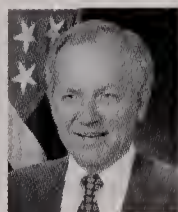
## **Tuesday, March 19**

**7:00am-8:00am**  
**Breakfast**

**8:00am-9:30am**  
**Panel: The Government Onramp**



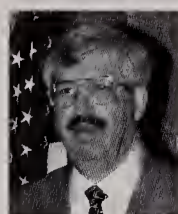
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Ron Piasecki  
Deputy Commissioner  
Office of Emerging  
Technology  
*General Services  
Administration*



**Co-Moderator**  
Deane Erwin  
Co-Chair  
*Federal Electronic  
Commerce Acquisition  
Program Management  
Office (PMO)*



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Electronic Messaging  
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Office of Emerging  
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*General Services  
Administration*



**Panelist**  
Tom Burke  
Deputy Commissioner  
Office of Information  
Security  
*General Services  
Administration*

**Panelist**  
Phil Smith  
Director  
Office for State-Federal  
Regulations  
*State of Iowa*

Budget cuts, changing technology and a need for government to be more responsive are causing revolutionary change in how the government does business. Paper driven processes are being replaced with electronic ones. "Stovepipe" application systems are being replaced with a common technological infrastructure meeting a wide range of user needs. Piasecki and Erwin are instrumental in the direction of three Program Management Offices (PMOs) that help develop the governmentwide messaging and electronic commerce infrastructure. This session will discuss how PMOs are providing enabling technologies and how they are implementing a new governmentwide information technology architecture.

**9:30am-10:15am**  
**Front Line Internet Strategies**  
**Serving Instant Global Markets**



William Crowell  
Staff Vice President &  
CIO  
*Meredith Corporation*

CIOs can lead their information systems organizations onto the front line of "new customer connections" that contribute directly to new revenues, new profits and new strategic customer relationships, and the instant global markets created by the Internet. Crowell foresees the expansion in the traditional relationships between consumers, marketing communications companies and producers as a critically important factor to the CIO's success in responding to these opportunities, being closer to the customer and creating instant global markets.

**10:15am-10:45am**  
**Coffee Break**

**10:45am-11:30am**  
**Concurrent Sessions**

**11:45am-12:30pm**  
**Concurrent Sessions: Repeated**

**12:30pm-1:30pm**  
**Luncheon**

**1:30pm-2:15pm**  
**Concurrent Sessions**

**2:15pm-2:30pm**  
**Coffee Break**

**2:30pm-3:15pm**  
**Concurrent Sessions: Repeated**

3:15pm-5:15pm

### Embracing Today and Tomorrow



Alan Kay, PhD  
Apple Fellow  
*Apple Computer, Inc.*

Thirty years ago, today was "the future." Despite the long time to prepare, the result for most has been surprise and disorientation and the difficulty of re-educating personnel in the "new" technologies. The technologies of the next 15 or 20 years are quite predictable, and though the predictions are as unbelievable and/or irrelevant as they were 30 years ago, they will have a similar impact on tomorrow's life and commerce. Alan Kay will explain how today happened, outline what will happen tomorrow and discuss how learning environments have to change in order to embrace today and tomorrow.

5:15pm-6:00pm

### Reception with Alan Kay

6:00pm-12:00am

### Hospitality/Networking

**Wednesday, March 20**

7:00am-8:00am

### Breakfast

8:00am-8:45am

### Relevancy + Originality + Impact = ROI: A Marketing Story



David King  
Vice President  
*DDB Needham  
Interactive  
Communications*

As corporations scramble to use the Internet to attract new customers, they need to remember that Internet-based campaigns must be integrated within the scope of a total marketing campaign. This session will focus on how corporations can avoid squandering their hard-earned brand equity

in cyberspace by reinforcing their "real world" marketing messages on the Internet. You'll learn how to use the Internet to enhance, rather than overshadow, your marketing messages by examining the strategies of several well-known corporations that are exploiting the Internet to increase sales and perpetuate their brands.

8:45am-9:30am

### Internet Games Are Olympic Business



Donna Jonsson  
Deputy Managing  
Director  
Communications  
*Atlanta Committee for  
the Olympic Games*

The Atlanta Committee for the Olympic Games (ACOG) is the first Olympic organizing committee to use the World Wide Web to communicate information about the Games. The 1996 Olympic Games Server helps ACOG respond to the tremendous interest that already exists in the Games and generates new audiences for the principles and philosophies of the Olympic movement. The challenge is to organize, present and keep current a rapidly growing mass of information to meet the needs of users ranging from the occasional television viewer to the ticket buyer to the avid sports fan.

9:30am-10:30am

### A Blueprint for Building a Web-Based Internal Information Network



Tim Horgan  
Webmaster  
*CIO Communications,  
Inc.*

As other speakers have indicated, the Web provides a powerful base to build an enterprisewide information network upon. To do this successfully requires solid strategy, planning and technical work. In this presentation we'll look at some of the ways compa-

nies are using the Web internally, along with the technical and organizational challenges they face. Drawing upon his personal experience at Digital Equipment, and as a consultant to several other large corporations, Mr. Horgan will outline a management and technical strategy which addresses these challenges and opportunities.

10:30am-10:45am

### Coffee Break

10:45am-11:45am

### Summary & Contrarian Commentary: Speaking Between the Lines



Robert M. Metcalfe, PhD  
Vice President  
Technology  
*International Data  
Group (IDG)*

Bob Metcalfe is an information technology guru who has excelled on all sides of the technology fence. Recipient of the IEEE Alexander Graham Bell Medal and Xerox PARC alumnus; he has also been a Stanford University consulting associate. Founder of 3Com and currently a worldwide syndicated columnist, Metcalfe will serve up a synopsis of what was really said during the past three days and deliver a tongue in cheek interpretation in his unique acerbic style.

11:45am-12:00pm

### Summary

## CONCURRENT SESSIONS

*Each Corporate Host will provide a concurrent session, which will be offered twice. You will be able to attend a maximum of six sessions, during three time blocks on Monday and Tuesday.*

### Mining Cyberspace for the Data You Need



Jennifer Barrett  
Senior Vice President  
Interactive Services  
Group  
Acxiom Corporation

One of the most misunderstood projects an IT professional can undertake is obtaining and managing third party data. Often this data is critical to the successful use of your data warehouse. In addition to grasping this specialized area of data warehousing, you must navigate the complexity of cyberspace — where rules are changing as quickly as they are learned. This session will give you a road map for making the best decision about where to get information, whether to buy this data and maintain it yourself or to interactively access it as you need it.

### Enterprise Computing & the Internet: Improving End-user Data Access Via the Web

James Jannetta  
Assistant Director of  
Computer Services  
University of Manitoba  
Courtesy of  
Antares Alliance Group

How can your organization take advantage of the industrial-strength qualities of the Web to give users better access to the information they need? This session will focus on the University of Manitoba's efforts to improve support of such critical functions as accounting, payroll and

student records by integrating Internet technologies with leading-edge development tools. The goal was to provide end-users with easier "ad hoc" access to and reporting of legacy data stored in IMS databases. The project focused on improving access to legacy data, the rapid delivery of a cost-effective solution and the flexibility to adapt to future requirements. The solution was to build a data warehouse application utilizing an open, fully-integrated applications development software environment, as the back-end for the data warehouse, and the Web as a GUI front-end for data access and communications.

### Routers, Hubs and Switches in Cyberspace



Dana Rasmussen  
Product Line Manager  
LAN Protocols  
Bay Networks, Inc.

CIOs must effectively assess the products and staffing requirements needed to provide Internet access and establish a Web home page for their corporations. They must have a set of guidelines to follow on the fundamental issues to consider when buying, building and managing Internet connectivity. This session will also provide a set of guidelines and recommendations while planning for Internet connectivity, making buying decisions and implementing systems. This session will review tools that ensure existing network security provisions are not compromised.

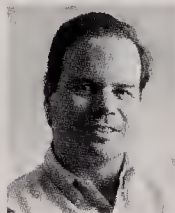
### Managing Change at the Business/Technology Intersection



Jose Leruth  
Director  
Strategic Alliances  
Data General  
Corporation

The next wave of commodity-based computing promises to deliver a quantum leap over today's price/performance numbers. However, enterprises absorb new technologies slowly. Just in the time it takes to implement new systems and business processes, an enterprise could find itself behind the technology curve. How can CIOs sort through the plethora of computing options and implement new systems that will allow them to take advantage of the next technology wave without putting today's business in peril? This session will provide you with strategies for surviving continuous change at the business/technology intersection.

### Beyond Notebook Chic: Making the Virtual Office a Reality



John K. Medica  
Vice President  
Portable Products Group  
Dell Computer  
Corporation

As hype continues to surround mobile computing — the fastest growing segment in the PC industry — CIOs are faced with challenging decisions regarding the virtual office and implementation of relevant technologies. Organizations that understand the relevant technologies of today's mobile PCs and the technology trends affecting future mobile computing are better positioned to meet their business needs while leveraging applicable technologies. Medica will discuss the challenges associated with choosing technologies for your business needs which provide productivity, longevity and stability in your virtual office.

Concurrent Sessions continued ➤

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### The Fastest Way to Get from Profit Drain to Profit Center



William Winters  
Division President  
Internet & New Media  
*EDS*

CIOs have incredible power to conceive, develop and drive the IT solutions that attract new customers, launch new business and redefine their industries. You'll learn how to create value as well as content, and how to build the infrastructure required to support Internet-enabled virtual corporations. You'll emerge from this session a changed person — thinking like a business opportunist and entrepreneur extraordinaire, ready to collapse value chains at will and boost revenue like never before, all by using the Internet. You will learn how to not only justify but also amplify your organization's existence and pump revenue into your company using the Internet.

### Mapping Business Opportunities on the Internet



Bernard "Bud" Mathaisel  
National Director  
Multimedia Consulting  
*Ernst & Young LLP*

The potential for business on the Internet cannot be ignored, though, to date, there is no evidence that any money has been made by conducting business on the Internet. The markets for business on the Internet have not yet arrived. Organizations need to be ready to take advantage of opportunities and begin initiatives now to be ready when they do arise. How can opportunities be identified, initiatives established and actions taken that will best position companies for the brave, and as yet undefined, new world of the Internet? This session will discuss this topic and what companies can do now to take advantage of the Internet and its promise for business.

### Wired for Business: Building the Extended Enterprise



Jan Silverman  
Director  
Internet Solutions  
Computer Systems  
Organization  
*Hewlett-Packard Company*

The real business opportunity with the information superhighway and the Internet lies in creating the extended enterprise. Successful companies focus on three areas: conducting commerce with customers, communicating within the organization and sharing information among companies. Leading edge CIOs are deploying global, internal Internets quickly and economically using open systems. This presentation, drawing on experiences at Hewlett-Packard and client companies, will highlight the opportunities and pitfalls of building this extended enterprise.

### Strategic IT: Business Analysis as a Competitive Weapon



Reed Chaikin  
Director  
Hyperion Enterprise  
Products  
*Hyperion Software*



Sandra Moran  
Director  
Accounting Products  
*Hyperion Software*

As business climates become more complex and less predictable, forward-thinking business strategy relies on proactive, intensive reporting and analysis on a variety of data sources. The success or failure of the corporate strategy is directly related to the quality of information analyzed and the strength and capability of the tools used to access, manipulate and present the information to knowledge workers. In this session, learn how the potent combination of client/server computing, OLAP technology,

data warehousing and graphical reporting tools enables the modern enterprise to capitalize on valuable corporate data sources and on-line information repositories for competitive advantage.

### Averting Security Hazards on the Internet



Kathy Kincaid  
Director  
IT Security Programs  
*IBM Corporation*

Many corporations are reluctant to embrace the Internet because they fear break-ins. This session will highlight the most prevalent threats on the Internet and quell fears by discussing the many proven tools and methodologies, such as encryption, firewalls and secure servers, that exist to ensure highly-networked business systems are not compromised.

### Data Warehousing: Where the Rubber Meets the Road



Marianne Elkholy  
Director  
Data Warehousing  
*Informix Software, Inc.*

This presentation will address real-world data warehouse implementations, examining the issues facing major corporations and the success factors that these organizations have identified. Elkholy will focus on the business drivers and key technology considerations while discussing how companies benefit from data warehousing's impact on their business practices. She will also discuss how historical data can be used effectively to make strategic business decisions, what end users require for decision-support applications, why open systems are the perfect environment for data warehouses, what the future holds for data warehousing and where the technology is headed.

Concurrent Sessions continued ➤

### **Reducing Chaos and Improving Productivity with Best Practices**



**Christine Comaford**  
President & CEO  
*Corporate Computing International (CCI)*  
an LBMS Company

Seventy-five percent of the five-year client/server cost of ownership is spent on labor — so why do we obsess over tools? We should be focusing on building our staff. The technology every CIO wants is one that replicates expertise and competence across the staff. If an organization only had more “superhero” developers, it could dramatically improve productivity, delivery, quality and consistency. Bringing in contract staff is a short-term solution, and bringing new people on board creates more turmoil. In this session, Comaford will describe proven strategies for harnessing innovation, capturing best practices and driving out mistakes across the enterprise.

### **Toys or Tools?**



**Edwin P. Cooper III**  
CIO  
Information & Technology Services Sector  
*Lockheed Martin Enterprise Information Systems*

Lockheed Martin is utilizing its IT resources to enable the successful management of a global, \$23 billion entity. The proper application of available technologies and preparation for upcoming technologies are vital to the future of an organization of this size. Cooper will discuss leveraging technology and a “virtual” organization strategy to market information services both internally and commercially.

### **Sharing the Cyberspace Vision**

*PictureTel Corporation*

This session will examine how videoconferencing, from the conference room to the desktop, can help

meet the challenges of today’s business demands even when mixed with the temptations of peripheral gadgetry. The session will include real examples of how teams can pull together, providing solutions that address both the bottom line and exploit cutting edge technology such as the World Wide Web. Join us for this informational and inspirational session and see how the presence of video capabilities in cyberspace will make you a believer, too.

### **Negotiating Complex Business Challenges for Competitive Advantage**



**Marc Demarest**  
Director  
Strategic Marketing  
*Sequent Computer Systems, Inc.*

Prospering in this fast-changing, globally competitive environment means organizations must concentrate on integrating technology into every aspect of their business, not just having an Internet presence. What may be elusive is how you can guarantee that the changes you make, internally as well as to your public presence, will lead your organization to increased profitability. This session will outline these changes and provide strategies to get you there.

### **You Need an Internet Strategy**

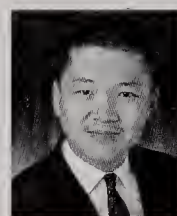
**Peter Kestenbaum**  
Director of Marketing  
Northeast Area  
*Sun Microsystems, Inc.*

**Hal Stern**  
Distinguished Systems Engineer  
Northeast Area  
*Sun Microsystems, Inc.*

If your company doesn’t have an Internet strategy, then you need to attend this session. Sun has a major share of the World Wide Web server market and has introduced the

hottest programming language, Java, that is revolutionizing the way to develop and implement software and applications. You will learn what key issues you need to address to build an Internet strategy for your firm that will help you compete and how Sun’s ubiquitous Java programming language and Internet products can help your firm implement an intranet and Internet strategy that will create zero friction for innovation.

### **The Quest for the Holy Grail: Reuse Unleashed**



**Yung Wu**  
Co-Chairman and Founding Partner  
*Castek Software Factory, Inc.*  
Courtesy of  
Texas Instruments, Inc.

The shape of software development as we know it today will be radically altered to recognize opportunities created from massive scale reuse on an industrywide basis. These opportunities are derived from publicly available inventories of reusable, model-based enterprise objects, sourced from multiple companies and certified through enterprise-object publishers. This session will paint a clear picture of the vision of an assembly-based software delivery process, the architectural standards necessary to implement reusability concepts and various organizational factors for embedding the concepts.

Concurrent Sessions will also be presented by:

**Gupta Corporation**  
**Microsoft Corporation**

## **COMPANION PROGRAM**

### **Sunday, March 17**

3:00pm-7:00pm

**Conference Registration**

7:00pm-9:30pm

**Welcome Reception & Registration**

9:30pm-12:00am

**Hospitality/Networking**

### **Monday, March 18**

9:00am-10:00am

**Tone and Stretch in the Tea Garden**

10:00am-11:00am

**Companion Breakfast**

12:00pm-1:30pm

**Luncheon with conference participants**

1:00pm-5:30pm

**Sweet Liberty Catamaran Tour (Optional)**

Advance registration & payment required

6:30pm-9:00pm

**Reception/Dinner**

9:00pm-12:00am

**Hospitality/Networking**

### **Tuesday, March 19**

7:00am-8:00am

**Breakfast with conference participants**

12:30pm-1:30pm

**Luncheon with conference participants**

3:15pm-5:15pm

**Embracing Today & Tomorrow**

Alan Kay, PhD

5:15pm-6:00pm

**Reception with Alan Kay**

6:00pm-12:00am

**Hospitality/Networking**

### **Wednesday, March 20**

7:00am-8:00am

**Breakfast with conference participants**

# Corporate Hosts

## **ACXIOM**

**Acxiom Corporation** builds data warehouses for clients whose businesses depend on scope, accuracy and accessibility of customer information. Using a unique matrix of services, software and tools that transform data into customer knowledge, multiple internal databases are integrated with external information to drive powerful, knowledge-based decision support applications. With expertise in industries such as retail, banking/finance, insurance and telecommunications, Acxiom helps clients better understand their customers, build effective acquisition and retention programs, reduce response time and improve customer service.



Founded in 1970, **Antares Alliance Group** develops and markets a unique suite of enterprise-spanning software products for business process improvement, legacy renewal, and rehosting, along with application development and execution in distributed environments. These products can be used to plan, build, and execute business-critical information systems in which host-based legacy and client/server architectures seamlessly participate across multiple platforms. The result is that organizations can easily transition to the business benefits of client/server computing.



**Bay Networks, Inc.** is a leading worldwide supplier of a full range of multiprotocol routers, intelligent hubs, high-speed switches and sophisticated network management products for organizations building enterprisewide information internetworks. With more than 1,500 resellers and 1,600 direct sales and service personnel worldwide, Bay Networks markets and supports its comprehensive product suite in 111 offices, providing 7x24 global support coverage. Bay Networks' World Wide Web address is <http://www.baynetworks.com>.

## Data General

**Data General Corporation** is an open-systems company specializing in commercial servers, storage products and services for information systems users worldwide. Our high-availability AViiON servers, DG/UX operating system and CLARiiON storage products form the foundation for large-scale enterprise computing. This foundation, coupled with software from our strategic partners, delivers a complete business solution. And, Data General's professional and systems-integration services pull it all together, to ensure a smooth installation and implementation.



A Global 500 company, **Dell Computer Corporation** designs, develops, manufactures, markets, services and supports a complete line of personal computers compatible with industry standards. Dell is the world's leading direct marketer of personal computers and one of the top five personal computer vendors in the world. With headquarters in Austin, Texas, and 16 international subsidiaries, Dell products and services are now available in more than 120 countries worldwide.



**EDS**

**EDS** works with customers ranging from small companies to the largest corporations and governments throughout the world. EDS is in the business of helping them transform market demands into results and business dreams into reality. To achieve this, we offer the insight that allows customers to imagine what's possible through the creative application of information. We then provide the insight to help them realize what's possible. Quite simply, we work side by side with our customers, helping them use information to do extraordinary things.

## ERNST & YOUNG LLP

**Ernst & Young**, a leading international professional services firm, today operates one of the world's largest and most influential Management Consulting practices. Our mission is to add value for our clients by designing and implementing business solutions that result in improved growth and profitability. Today, Ernst & Young consultants are working with leading corporations on large-scale reengineering, organization change and information technology initiatives. These efforts are resulting in dramatic cost savings, cycle-time reductions, knowledge-based development and customer service innovations for clients.

## **GUPTA**<sup>TM</sup>

**Gupta Corporation** is a market and technology leader in client/server systems. Founded in 1984 and traded on the NASDAQ exchange, Gupta Corporation reported 1994 revenues of \$64.5 million and employs 400 people in 24 offices worldwide. Today, Gupta is the leading provider of multidatabase application development tools and deployment components. Worldwide, more than 100,000 developers have licensed its award-winning SQLWindows application development system and more than a million users have deployed its SQLBase database management system. Gupta counts among its customers companies such as United Parcel Service, United Airlines, Allstate Insurance, Citibank, Toyota, Singapore Airlines, Siemens-Nixdorf, Daimler-Benz and Ford Motor Company.



**Hewlett-Packard Company** is an international manufacturer of measurement and computation products and systems recognized for excellence in quality and support. The company's products and services are used in industry, business, engineering, science, medicine and education in approximately 110 countries. Hewlett-Packard has 98,600 employees and had revenues in excess of \$25 billion in its 1995 fiscal year.

**TO ENROLL CALL 800-366-0246**



**Hyperion Software** is the software industry's pioneer in client/server financial and accounting solutions for large, multinational corporations. The company's product suite includes a wide spectrum of accounting, management reporting, financial consolidation, budgeting and information access software. Products include *Hyperion Enterprise* for enterprise financial management, *Hyperion Pillar* for budgeting and financial planning, and *Hyperion Financials* for corporate accounting. With more than 2,300 corporate customers, Hyperion is ranked second in the client/server accounting market by IDC. The company was formed as IMRS in 1981.



**IBM Corporation** is the world's largest manufacturer of information systems for business, the home and the Internet. It is also the world's largest software producer. Based in the United States, IBM does business in virtually every country in the world. In each of these markets, it is regarded as one of the leading corporations. IBM designs, develops, manufactures and distributes information technology solutions that include everything from sub-notebook size personal computers to the largest supercomputers. The hardware solutions are enhanced through IBM's comprehensive software, customer service and maintenance offerings. One of the founding developers of the Internet, IBM offers easy and comprehensive solutions to help people get connected to the Internet and take full advantage of its tremendous resources.



**Informix Software, Inc.** is the leading supplier of high performance, parallel processing database technology for open systems. Informix's database servers are the number one choice of hardware manufacturers for publishing Transaction Processing Council benchmarks for UNIX-based systems. Informix products also include development tools for creating client/server production applications, decision support systems, ad-hoc query interfaces and connectivity software that allows information to be shared transparently from PCs to mainframes within the corporate computing environment.



**LBMS, Inc.** is a leading provider of process management tools for Fortune 1000 organizations. The company's products leverage benefits of workgroup computing and open partnerships to address the complex demands of application development in organizations with heterogeneous computing environments. LBMS' products can be used individually, as components in a mixed-vendor client/server environment, or together in a seamless application development toolset. LBMS tools operate in an open LAN server-based repository system ensuring consistency, integrity and completeness in the application development process.



The new **Lockheed Martin Corporation's** Information and Technology Services Sector has emerged as the business and technology solutions partner of choice for customers who demand competitive, value-added innovation. Lockheed Martin, with \$4.5 billion in sales and 35,000 information professionals worldwide, offers business and IT architecture services, applications and systems integration and information processing operations for commercial and government customers. Our experience spans 30 years in managing information and communications technology projects for clients in markets such as retail, health care, energy and utilities, identification and state and local governments.

## Microsoft®

The **Microsoft Business Systems Division** serves the rapidly changing business solutions market, where companies are increasingly looking for ways to better use and effectively integrate corporate and desktop data. To meet these enterprise needs, Microsoft has created Microsoft BackOffice, an integrated information system that makes it easier for companies to improve decision making and streamline business processes. Microsoft BackOffice includes our best-of-breed business systems products for network operating systems, relational databases, systems management, IBM=AE host connectivity, workgroup computing and electronic mail. This integrated system allows customers to deliver their goods and services faster and reduce business costs.



PictureTel

**PictureTel Corporation** is the global leader in videoconferencing. The company develops, manufactures and markets a full range of visual communications solutions from the desktop to the conference room, including products for data conferencing and conferencing over local area networks. PictureTel also markets network services and has a comprehensive portfolio of enterprisewide services. The company has sales offices in more than 100 cities across 50 countries. PictureTel also has forged alliances with global leaders in telecommunications and computing, including Microsoft, IBM, AT&T, Compaq, MCI, NTT and Zenith Data Systems. The company's enterprisewide visual communications products and services are "Redefining the Way the World Meets."

## SEQUENT

**Sequent Computer Systems, Inc.** is a leading provider of open client/server systems for large-scale commercial computer applications in on-line transaction processing, decision support and business communications. In 1983, Sequent invented open symmetric multiprocessing (SMP), pioneering the concept of PC economics and a simple programming model for large-scale computing. In addition to its industry-leading SMP systems, Sequent provides architectural consulting, professional services and partnerships with database and application suppliers, and markets complete solutions through its direct sales organization.



Described as the "King of the Internet" by *Business-Week* magazine, **Sun Microsystems, Inc.** is the premiere provider of open systems and solutions for the enterprise and Internet. Among the Internet and networking technologies developed at Sun are: NFS, the open standard for file sharing across networks; Java, the first programming language to provide a comprehensive solution to the challenges of delivering applications across public networks such as the Internet; HotJava, an interactive, multimedia Internet web browser; Netra, a "plug and play" solution for Internet connectivity to PC-LANs and SunScreen, a sophisticated network security solution. Founded in 1982, Sun, a Fortune 120 company, has annual revenues of \$6 billion, employs 14,000 people worldwide and is headquartered in Mountain View, California.



**Texas Instruments Software** has the solutions to help organizations meet their rapidly changing business needs. These solutions are based on the concepts of empowerment, flexibility and productivity. Composer provides the ability to build and install executable business objects, or software components, that contain the data integrity and business rules that run the enterprise. Our Arranger product provides business users the capability to browse these objects, snap them together, and implement them so they can be executed from desktop tools such as Excel and Visual Basic®

TO ENROLL CALL 800-366-0246

# ENROLLMENT FORM



## The CIO and Cyberspace: The Business/Technology Intersection

Sunday, March 17–Wednesday, March 20, 1996  
Ritz-Carlton ■ Naples, Florida

Please print and complete this form in its entirety, then forward to the attention of Executive Programs. **Fax** to 508-879-7720. **Call** us at 800-366-0246. **Mail** to: CIO Communications Inc., 492 Old Connecticut Path, Framingham, MA 01701.

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

MAIL STOP \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP CODE \_\_\_\_\_

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FAX \_\_\_\_\_

E:MAIL \_\_\_\_\_

WHAT IS YOUR INDUSTRY? \_\_\_\_\_

YOUR NAME AS YOU WANT IT TO APPEAR ON YOUR BADGE \_\_\_\_\_

HOTEL ARRIVAL DATE \_\_\_\_\_

HOTEL DEPARTURE DATE \_\_\_\_\_

NAME OF COMPANION (IF PARTICIPATING IN COMPANION PROGRAM) \_\_\_\_\_

### CHECK ALL THAT APPLY:

#### ENROLLMENT FEE

☐ **IS Practitioners/Executives**

If you are a CIO, IS executive or hold another executive position, the fee is **\$1,495**.

☐ **Government/Military**

The fee, which includes your hotel for three nights, is **\$1,930**. Do not make your own hotel reservations, **CIO** will make them for you.

☐ **Sales/Marketing/Consulting**

If you hold a sales, marketing or consulting position, the enrollment fee is **\$5,000**. **CIO** will make the final determination of this category.

☐ **COMPANION PROGRAM (\$199)**

Companions must be enrolled in this program to attend any conference-related functions. Includes all scheduled meals, entertainment and companion get acquainted breakfast. Conference session attendance not included.

☐ **Sweet Liberty Catamaran Tour: \$52**

A 2½ hour cruise of Naples Bay and the Gulf of Mexico.

☐ **I will not be staying at the Ritz-Carlton.**

#### PAYMENT INFORMATION (Please make checks payable to CIO Communications, Inc.)

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☐ P.O. # \_\_\_\_\_

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☐ AMEX ☐ VISA ☐ MC Exp. \_\_\_\_\_

Signature: \_\_\_\_\_

Please  
Attach  
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Card Here

#### ATTIRE

Casual! Please, no suits, ties or business attire!



#### HOTEL ACCOMMODATIONS

A block of rooms has been reserved at the Ritz-Carlton. We urge you to make your reservations early by calling the hotel at 800-241-3333. Be sure to identify yourself as part of the **CIO** conference to receive the conference rate. Please make your reservations early. Please guarantee your room with a credit card, as all unreserved or unguaranteed rooms will be released on 2/17/96. Hotel reservations/cancellations and charges are your responsibility. **CIO** will make hotel reservations for government/military participants.

#### TRANSPORTATION

American Airlines is the official conference carrier. Call American at 800-433-1790 and reference Star File #S0336MA. AVIS is the official car rental provider. Call AVIS at 800-331-1600 and reference K027830.

#### ENROLLMENT FEES

All enrollment fees must be paid in advance of the meeting. Fee includes conference sessions, concurrent sessions, corporate host displays, conference materials and scheduled meals. Transportation, hotel and recreation are your responsibility.

#### CANCELLATION

You may cancel your enrollment up to 3/11/96 without penalty. No refund or credit will be given for cancellations received after 3/11/96. You may send a substitute in your place.

**CIO** reserves the right to decline enrollment to any registrant.

# CIO

PERSPECTIVES  
Corporate Hosts

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- Bay Networks**  
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## THE CIO AND CYBERSPACE: THE BUSINESS/TECHNOLOGY INTERSECTION

**MARCH 17-20, 1996**  
**RITZ-CARLTON - NAPLES, FLORIDA**

**800.366.0246**  
*(for enrollment information)*

# TRENDLINES

Francisco, where an international team of 80 editors, designers and programmers will assemble an "instant"

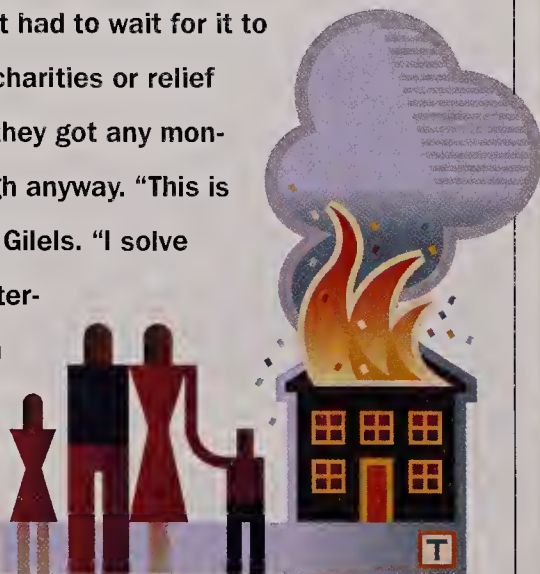
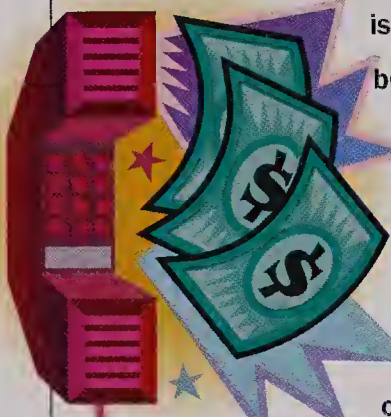
World Wide Web site. The goal is to produce unprecedented online photojournalism on a global scale. ■

## NICE GESTURE

We've all known people or causes to which we would have liked to donate. But we didn't, perhaps, because we suspected the money might never reach the intended recipient. Too often, money donated to large charitable and relief organizations is diverted or lost as it filters through the bureaucracy. Freehold, N.J.-based National Independent Carrier Exchange (NICE), a privately owned long-distance company, has instituted a system that enables people to donate money directly to a specific family or individual by calling an 800 telephone number.

Newspapers and TV and radio stations can include NICE's 800 number in stories about tragedies such as house fires; each case has a different extension, and contributions are made over the phone using a credit card. NICE deducts the cost of the 800 service and the bank card charges, which together range from \$1.50 for \$10 donations to \$4 for \$100 donations, then delivers checks to the stations or publications, which in turn deliver the check to the recipients.

The program's genesis can be traced back to Jerry Gilels, executive vice president of NICE and president and co-founder of NICE's sister company, NICE Interactive Marketing Services Inc. Gilels got the idea after seeing examples in his own life of people who needed help but had to wait for it to trickle down through large charities or relief organizations. By the time they got any money, it usually was not enough anyway. "This is what I do for a living," says Gilels. "I solve marketing problems with interactive voice technology. I'm lucky enough to understand technology enough to use it to solve problems like these." ■



## EVENTS

### Business Process & Workflow Conference

Feb. 19-22  
Walt Disney World Dolphin,  
Lake Buena Vista, Fla.  
Giga Information Group Inc.  
800 874-9980 Ext. 178

This conference focuses on tools for building real-world information technology solutions and features user forums, product evaluations, hands-on product test labs, preconference tutorials and special sessions for vendors. Attendees will learn what's involved in the business-redesign process and will develop understanding of workflow technologies.

Registration: \$995

### The Information Technology Outsourcing Institute: Designing, Negotiating and Implementing Deals

Feb. 27 & 28  
The Grand Hyatt, New York  
Business Development  
Associates Inc.  
800 394-9390

Attendees will gain an understanding of the elements of successful outsourcing arrangements. Topics include creating metrics for evaluating vendor proposals, obtaining competitive pricing, streamlining the negotiation process, installing effective benchmarking programs.

Registration: \$995

### Reengineering the Supply Chain

Feb. 28 & 29  
Orlando Renaissance,  
Orlando, Fla.  
ICM Conferences Inc.  
312 540-5688

This conference discusses how logistics network management can lead to greater competitive advantage. Topics include inventory management, contract logistics services, supplier relationships and technological tools (including the Internet).  
Registration: \$1,195

### Preparing for a Cashless Society in the 21st Century

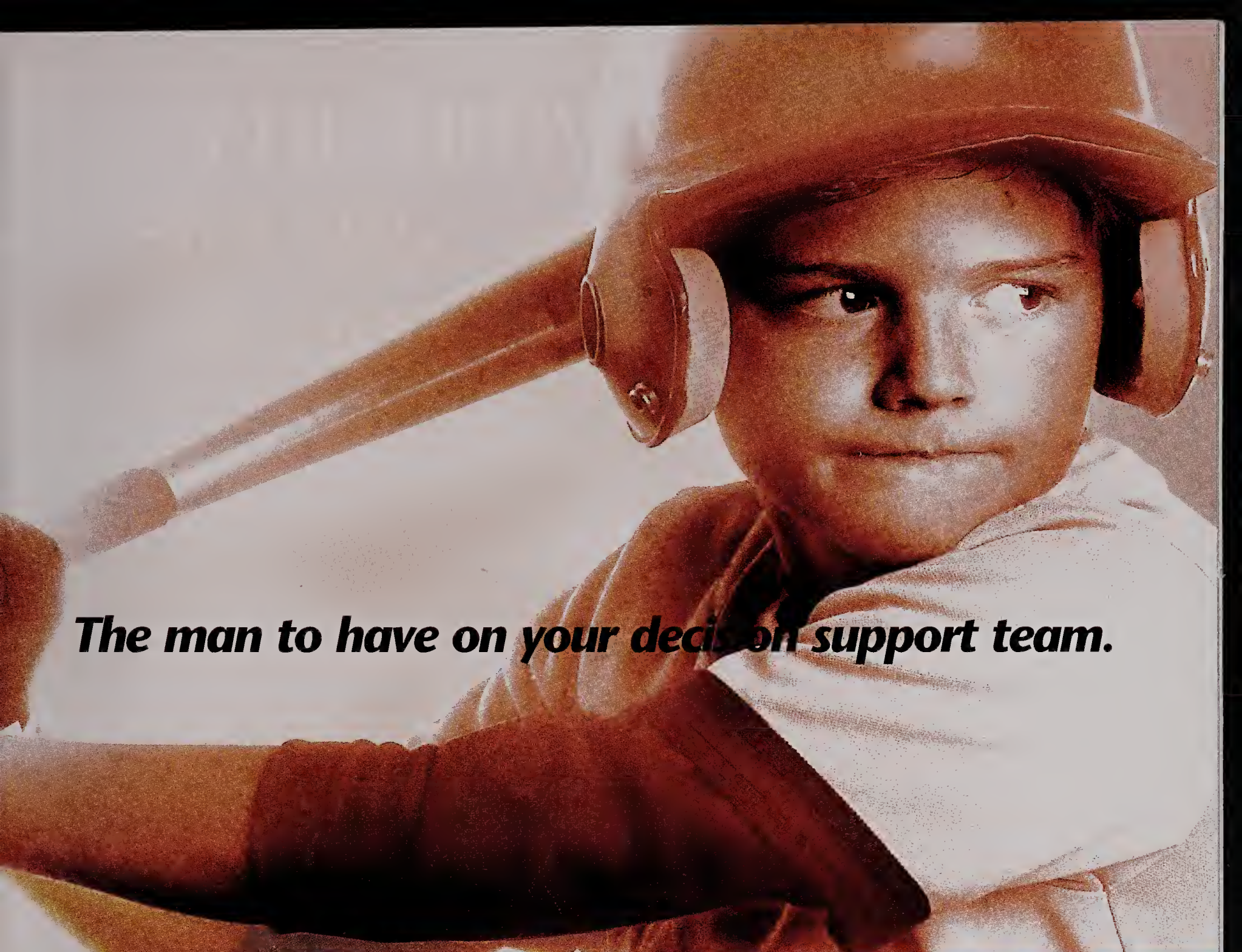
Feb. 29 & March 1  
The Wyndham Metrocenter  
Hotel, Phoenix, Ariz.  
ICM Conferences Inc.  
312 540-3845

This industry summit explores strategies for implementing an electronic payment system and presents case studies of organizations that have already done so.  
Registration: \$1,195

### Managing the Information Resource: Information Technology and the New Value Equation

March 10-15  
James A. Collins Center for  
Executive Education,  
Los Angeles  
The Anderson Graduate School  
of Management at UCLA  
310 825-2001

This biannual short-term course emphasizes creative thinking, leadership and management skills to help information systems executives stay abreast of technology. Participants will learn how to provide low-cost, high-speed delivery of high-value applications, integrate human and technical infrastructures, reinvent the IS organization and develop people skills.  
Registration: \$4,200



**The man to have on your decision support team.**

● If you knew Tommy's Mom was one of your best charge card customers, you could decide to promote perfume when she took him shopping for spikes. And if such knowledge enriched every aspect of your business, all your business decisions would be better. Which is the best reason to do business with us. Our decision support systems bring the customer knowledge you need to drive your business, to your desktop.

● Whether you're deciding on promotions to increase charge card usage, evaluating

loyalty programs or lifetime value, we can provide the knowledge you need to make better customer-focused decisions.

● We start by enriching your internal customer databases with external InfoBase™ information, transforming them into an integrated customer knowledge base. The data warehouses we build make this knowledge available

enterprise-wide. Our software, tools and services make it easily accessible from desktop PCs. And our long experience has resulted in industry models that enable us to implement systems that suit your needs precisely. Quickly.

Customer-focused decision support. From Acxiom. The knowledge you need to win in the big leagues.

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# Think Tank

BY TOM DAVENPORT

## *Seven Syllables of Salience*

**E**VEN THOUGH AT&T IS selling off Bell Labs, I'm still impressed by one of the intellectual outputs from one of its more visible smart guys, Arno Penzias. Penzias' Law says that anyone who stands between a customer and a computer that can fully meet the customer's need will eventually not have a job. This law is an intriguing one, particularly for any firm or worker in an intermediate industry or job. In short, it means "disintermediation" by IT.

Intermediaries don't make a product or service themselves; they simply distribute it or connect the buyer with the manufacturer or seller. They profit from information inefficiency; the less sellers know about buyers and vice versa, the more money intermediaries can make.

There are lots of intermediaries in the contemporary economy; think of travel agents, stockbrokers, real estate agents, insurance brokers and agents, mortgage brokers, food distributors, wholesalers, warehousemen and even retailers of many types. We can even find intermediaries within

corporations. Some corporate librarians, for example, are justifiably worried about being disintermediated out of their jobs by individuals performing their own information searches.

Fortunately for these intermediaries, Penzias' Law has not been enforced in the past. Disintermediation has remained, like most seven-syllable words, largely an academic concept. Most of these distributors, agents and brokers still have jobs in spite of the fact that computers could do a lot of what they do. Oh, sure, it has had some effects in some industries. Stockbrokers have prospered less than they might have otherwise because investors can buy and monitor stocks by computer. Wal-Mart has told its former distributors to get lost; it increasingly interfaces directly by computer with manufacturers. Most industries, however, could thumb their noses at Arno in the past.

But something called the World Wide Web has changed all that. The Web has a better chance than anything of making Penzias' Law come true. It addresses many of the problems that kept previous technologies

from doing serious harm to intermediaries.

If you look at the attributes of disintermediating technologies (see box, Page 22), it's an almost perfect job description for the Web. At last count, the Web was accessible to 37 million people, many of whom buy stuff in mass quantities. It's easy to use, unlike some of the systems that passed for consumer interfaces in the past. (Have you ever tried booking an airline reservation through EAASY SABRE, for example? It was one of the best reasons yet to visit a TRAAVEL AGENT). Color, audio and video are all possible on the Web, if still a bit tricky to use. And clicking on a product or price listed in a Web-based electronic market can easily vault you to more product specs and disclaimers than you could ever desire.

**N**OT SURPRISINGLY, intermediary killers are flocking to the Web. There are several online malls, which disintermediate retail shops. The Electronic Newsstand has the potential to disintermediate magazines and



PHOTOS BY WYATT MCSPADEN

# The only network storage systems that won't box you in.

The last thing a data network storage system should make you feel is trapped. So to keep you ahead of the game, AT&T CommVault developed a fully integrated line of network storage management solutions that offers optimum flexibility. Backed by the incomparable AT&T reputation, our data network storage systems can accommodate more server platforms than any other storage systems—including GIS, Sun, Tandem, HP, IBM, SGI, DEC, Auspex and many more. From automated backup and retrieval, to large database storage management, to hierarchical storage management and on-line/near-line archiving, we provide an extensive selection of unique products and services to meet any network storage need. And, your

system will be continually supported by the most extensive range of options, offering you the greatest flexibility and growth. Accepting full-system responsibility, our service/support program is unique within the industry. By being the single-point-of-contact, our highly-trained technicians are able to provide the most responsive service and support. By offering a complete solution, our systems help manage all your network storage devices more efficiently and with greater data integrity—reducing new system costs, increasing user productivity and eliminating the risk of unauthorized file access. So choose the data network storage systems that offer you the most freedom—AT&T CommVault.



For more information, call us at 1 (800) 331-6207, fax (908) 935-8040, or visit our web site at <http://www.att.com>  
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connect readers directly to writers. American Airlines has announced its intention to allow Web access to SABRE for reservations, further weakening travel agents. And items like real estate and stocks are currently offered by traditional intermediaries on the Web, but their cartels won't last forever.

Perhaps one of the most interesting Web markets was recently announced. InsWeb, from the Burlingame, Calif., company Strategic Concepts, is an on-line market where insurers can advertise their policies and prices: If you live in Utah, you can already buy car insurance through it. Soon, its Web page promises, competitive quotes for car or life insurance will be available on one page. If I were an insurance agent, I'd be investigating career alternatives.

InsWeb, like many emerging electronic markets, currently protects the existing distribution structure by referring purchasers to agents. Similarly, most of the real estate Web sites are controlled by local broker associations (although, tellingly, several also offer reduced broker commissions). But it's only a matter of time before consumers start to realize that the insurance companies without brokers offer significantly lower-priced policies. When that happens, the companies that still use them will start to reconsider.

The overall impact of these Web systems on business is mixed. Web services can provide much greater access to consumers, but they also lead to what economists call a more efficient market. Guess which attribute of your products or services is easiest to compare in a one-line display? A hint: In the U.S., it's expressed in dollars and cents. Web-

based electronic commerce will lead to ruinous price competition in many markets. What besides price would drive your selection of commodities such as insurance, stocks, personal computers or whole wheat bread? As

Max Hopper once noted, electronic markets make every company a slave to its dumbest competitor. They also mean that the corporate leanness binge isn't dead yet; one popular way to get prices down is to keep cutting heads.

If you or your firm happens to be one of these intermediaries, you may wonder if there is anything you can do to forestall your demise. First, hire a good consultant (but not me—I'm writing everything I know on the subject in this column!). Second, figure out if there is any way you can co-opt the trend to Web-based markets and make money. You could start your own WebMarket, for example, and try to convince the other members of

your industry to display their products and services through it. If you cannibalize your own mediation services, maybe you can at least eke out a transaction fee. With luck, you'll have a Web version of SABRE; more likely, you'll face continual battles with industry acceptance, as has Baxter Healthcare with its ASAP Express system.

In some industries, intermediaries have avoided being undercut by IT by banding together. Your friendly real estate broker can extract 6 percent commissions, for example, because local real estate boards control the multiple listing service. These groups are also trying to control Web real estate sales. But some smart entrepreneur will soon set up a Web page and charge maybe 1 percent to display your

home—complete with audio, video and, by then, perhaps even the computerized smell of baking bread—to millions of potential viewers.

## Defining Attributes

*Disintermediating technologies have several characteristics.*

- They are broadly available, so just about any potential buyer can get to the sellers on the network.

- They are easy to use.

- Since commerce isn't an activity that thrives on black-and-white text, these technologies have to be able to display color, audio and video.

- They make it easy to get from a concise little item in a display to lots more information about the item if the consumer's interest is piqued.

**A**NOTHER COMMON strategy is to try to hold onto your customers by emphasizing high-quality service. The idea is that customers will utilize my stock-broking services over a cheaper, IT-based alternative because I also provide them with financial planning services, for example.

The risk in this strategy, of course, is that other firms will unbundle the services offered. Even if the enhanced services are valued, they can be bought elsewhere more cheaply or at higher quality. Some of these enhanced services involve information, and the Web will eventually be used not only to connect buyers and sellers but also to sell previously bundled-in information. It won't be long, for example, before we see on-line financial planning on the Web being used to attract consumers to stock and securities sale sites.

Some markets remain relentlessly nonelectronic—the New York Stock Exchange, for example. Presumably they stay that way not only because they have developed a dominant market position but also because they don't involve consumers as customers, or the consumers are relatively unsophisticated. Like the NYSE, however, these markets will lose share over time.

So if you're an intermediary, you should be working overtime on a survival strategy. If you're a seller or buyer who deals with intermediaries, you should start thinking about how the Web can help you circumvent them. Whatever your position, be careful: More information can sometimes be hazardous to businesses and markets. **CIO**

*Thomas H. Davenport is a professor and director of the Information Management Program at the University of Texas in Austin. He welcomes reader comments at: Tdav@notes.bus.utexas.edu.*

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Making Client/Server Work

# Mining for Gold

This year's Enterprise Value Award winners have extracted real value from a variety of challenging conditions. They have helped their organizations adapt to significant changes in their industries and markets—and garnered some pretty impressive financial returns in the process.

that had achieved and could document a real return on investment from information technology. Since that time, we've come to see that there is a lot more to value than what meets the accountant's eye. While improving the company's bottom line is always a top priority for any executive, that alone is not enough. In fact, sometimes even a system that delivers just a small return can have a huge impact on a company's success.

**W**hat does it mean to provide value to your enterprise, and how do you know when you've achieved that most desirable of goals? The answer lies in business results. When the CIO's efforts lead to such outcomes as increased efficiency, the ability to penetrate new markets or a dramatic improvement in customer service, you've got something to talk about.

Four years ago, we set out to honor companies

Over the years, our awards have evolved to reflect this understanding as well as to recognize the changing role of information technology within organizations. IT has become much more critical to companies' success. Technology for its own sake is still anathema, but technology for the organization's sake can do amazing things.

This year's Enterprise Value Award winners are impressive by any standard. We hope you enjoy

## This Year's Winners

28

**MCDONNELL DOUGLAS  
HELICOPTER SYSTEMS'**

multimedia marketing system lets customers "create" customized aircraft and see them fly. Salespeople can provide accurate price quotes on the spot.

34

**BRIGHAM & WOMEN'S  
HOSPITAL'S** provider order

entry system improves patient care, helps prevent adverse drug reactions and decreases the number of redundant or unnecessary tests. As a result, it saves the organization millions of dollars annually.

38

**ROCKWELL INTERNATIONAL'S  
SPACE SYSTEMS DIVISION'S**

document storage and retrieval system has shaved weeks off space shuttle launch schedules and saved millions of dollars for the division and for NASA. NASA was so impressed with the system that it now requires other suppliers to place engineering drawings and other information on it.



# THE CIO ENTERPRISE VALUE AWARDS

42

An artificial intelligence system automated much of **UNITED HEALTHCARE CORP.'S** manual claims review process, drastically reducing the cost per claim reviewed and freeing nurses to turn their attention to higher-level analysis.

46

**GENSYM CORP.'S** help desk spreads customer service throughout the company by centralizing data on sales and product support, and providing a tracking system for that information.

52

A fully integrated system used by all of **TELOGY INC.'S** functions and departments is supporting the company's rapid growth in the electronic test equipment market.

reading the stories about them as much as we enjoyed researching and writing them.

### Methodology

This year, *CIO* editors assumed the responsibility of examining the nominated systems' strategic value to their organizations, the degree to which the systems were internally conceptualized and driven, and their ability to deliver significant ROI. We passed on the entrants that qualified for further consideration to the Chicago Research & Planning Group, a CIO member organization in Glencoe, Ill. CRPG executives and members of its CIO Consulting Group went through the applications in detail. Their objective was to learn what each system was doing and verify that the benefits claimed could be directly attributed to the system and that the costs were fully reported.

Four members of the CIO Consulting Group then conducted on-site meetings with the applicants and

others involved in developing, implementing and using the systems. They also observed each system in action to determine its impact on the business.

After the site visits were concluded, the examiners presented their cases to one another and to the CRPG executive staff. Finally, they delivered reports, along with their notes and the original applications, to a panel of distinguished judges (see box).

The judges spent a day together in Chicago evaluating and discussing the material, asking tough questions of the examiners and debating each system's value (see box for a description of the criteria). They reached full agreement on the six winners by the end of the day.

We applaud our 1995 Enterprise Value Award recipients and all the nominees who participated in the process. We hope that from their example, others will learn the value of teaming IS with business to further their organizations' goals.

—Abbie Lundberg, Editor

# Deciding Factors

The judges based their decisions on the following criteria



### Business Value

The most important deciding factor was the extent to which the system adds business value and furthers the organization's strategic objectives.

### The Importance of Technology to Achieving Results

The judges looked at whether the business need could have been satisfied without the system and how much of the overall process was touched by the technology.

### Strategic Partnering

The judges tried to reward true collaboration between the user and technology communities—each bringing its best to the endeavor.



### Return on Investment

Relative ROI among the finalists was not a big factor in selecting the winners. Although showing significant ROI was important to making the first cut, by the final stage it was considered a given.

## THE JUDGES

**Richard G. Arns**  
*Executive Director*  
Chicago Research  
& Planning Group

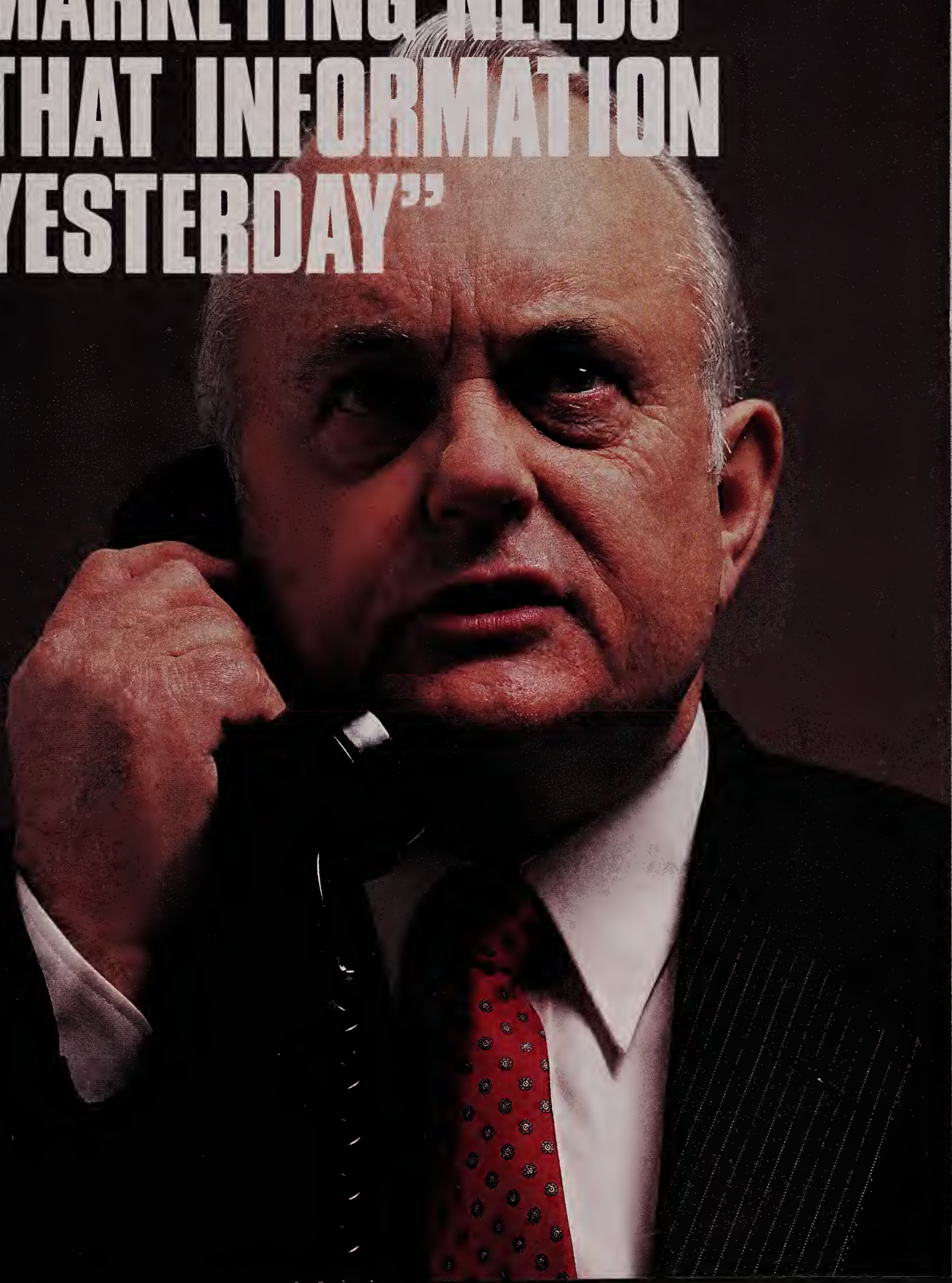
**Donald G. Brungard**  
*Vice President, Information  
Technology and CIO*  
American National Can Co.

**John L. Kordash**  
*Vice President,  
Information Strategy*  
Caremark Inc.

**Don B. Saulic**  
*Vice President, Information  
Technology*  
Budget Rent a Car Corp.

**Joseph P. Thompson**  
*Vice President, Manage-  
ment Information Systems*  
Stone Container Corp.

**“MARKETING NEEDS  
THAT INFORMATION  
YESTERDAY”**



# Birds on a Wire



By putting product information online,

McDonnell Douglas Helicopter Systems helps its salespeople close deals on the fly

BY MEGAN SANTOSUS

**T**here was a time when buying a helicopter from McDonnell Douglas Helicopter Systems (MDHS) wasn't much different from buying a new car: You would meet with a sales representative to go over models, performance requirements and available options, decide on your preferred dashboard configuration and sign a purchase agreement that included terms and conditions for price, delivery date and financing. Then you would wait. And wait. Until it was finally delivered with the fuel gauge in the wrong place.

But times have changed. These days, buying a helicopter from MDHS just might be easier—and more fun—than buying a car. For one thing, there's no quibbling back and forth among sales reps, finance managers and customers, no negotiating an initial contract that's rejected later because the terms aren't just right. And customers get to design their own instrument panel layouts and mix and match paint schemes. "Every commercial aircraft we sell has a great deal of customized features," says Alan Neugebauer, manager of business development for McDonnell Douglas's light helicopter line including the MD 500 series.

The high level of customization and the relatively painless sales process are made possible by an elec-

tronic marketing system that uses multimedia technology. Salespeople are outfitted with Macintosh PowerBooks from Apple Computer Inc. that are loaded with full-motion video, animation and graphics and can play clips of helicopters in action, show the look of different paint schemes and help the customer create a cockpit design to scale. They can also produce accurate, legal purchase agreements in minutes. "This is a great example of using multimedia as a marketing tool," says J. Brad Roberts, the systems analyst responsible for coding and testing the system.

It's also a good example of using information technology to achieve significant business benefits. By automating every task associated with creating sales documents, the system has simplified the purchasing process for customers and salespeople alike by eliminating mistakes and minimizing delays. Preapproved prices, options and configurations are stored in a database that is accessible to the field sales force. Any changes, either with pricing or option availability, are easily updated from the home office. Salespeople can perform what-if scenarios for customers who may be limited by a strict budget or are undecided about red body paint or blue.

One need only look at how MDHS used to conduct business to appreciate the full impact of the electronic marketing system. The process of creating purchase agreements was a paper-filled quagmire of errors, bottlenecks and misinformation. Field salespeople bore the brunt of manually reconfiguring customer requirements every time changes were made; those in contracts, administration, busi-

ness operations and manufacturing tried to manage the repercussions. The real losers, however, were the customers: On average, it took 48 days to complete the sales cycle, a wait that might have been acceptable if the finished product were delivered precisely as ordered. But too often customers would discover mistakes once the vehicle was delivered. Given its tortuous sales process, MDHS seemed to be begging for disappointed customers.

In a typical sales call, a sales rep would use various brochures to pitch the benefits of a single-turbine helicopter to a customer. The rep would take the customer through a booklet listing the 100 or so available options, from air-conditioning to special radio navigation systems. The customer would choose from a variety of color options (light blue metallic with red stripes, for example) and possible configurations for the instrument panel. The rep would jot down all this information by hand, sketching a panel layout with the precision of an abstract painter. The price would be negotiated, the deal closed. And then the papershuffling would begin.

After receiving a handwritten order from the field rep, the completion office would check whether the options configured by the salesperson would actually work together. A week later, the contracts department would get involved to ensure that the terms and conditions were not out of whack. Finance would enter the picture to calculate payments. If everything passed muster, a secretary typed up a purchase agreement on a five-page form, which then went back to the customer for approval. If the customer was satisfied, the agreement traveled back to the home office, where a committee decided to accept the deal or nix it.

Oh, if only things could've gone so well.

For starters, price lists weren't published for fear that salespeople might quote outdated numbers. Sales calls were often held up until current prices arrived from headquarters. And as options multiplied, so did the intricate configuration requirements. The completion office might flag an incompatibility between the radio navigation system and the air-conditioning unit and ask the sales rep to alert the customer to choose alternate option configura-



ANDY MILLER (l.) and ALAN NEUGEBAUER handled increased marketing demands with technology.

## DEFINING VALUE

An electronic marketing system that uses multimedia technology replaced the company's manual method for configuring options and calculating prices to simplify the purchasing process, eliminate mistakes, minimize delays and increase productivity.

tions. But with the customer on the phone, the rep might discover that the preferred air-conditioner had been discontinued by the manufacturer two months ago.

Invariably, a purchase order would wend back to the customer, who would have a change of heart. Perhaps turquoise metallic with yellow accents would be preferable to the light metallic blue. "That was the absolute worst situation because then we'd have to start the whole process from scratch," says Neugebauer. It was not unusual to have to redo paperwork three to five times.

Once the paperwork was approved, errors still had an insidious way of creeping in. Because sketches were not drawn to scale, they were often inaccurate. When manufacturing discovered that only four instruments could fit where five were requested, the design would be changed; and manufacturing wouldn't always notify the salesperson or the customer. The discrepancy would come to light only when the helicopter was delivered.

In 1991, Bob Grace, who was then director of marketing, asked the information systems group for help. This was somewhat unusual, given that marketing generally did its own thing as far as systems went. "Before this project, marketing didn't have any applications development," recalls Brad Barnes, the manager of applications who did systems integration.

## ANATOMY OF THE SYSTEM

**HARDWARE:** Macintosh PowerBooks (165Cs and 170s), equipped with GCC Technologies Inc.'s Write-Move II printers in the field; Apple LC II server for pricing and options; and Centris 610 and Power Macintosh 6100/66 desktops in the home office.

**SOFTWARE:** Configuration and

purchase agreement applications developed in-house using 4th Dimension by ACI US Inc.; digital brochures developed with Apple Computer Inc.'s HyperCard and QuickTime; packaged software includes Microsoft Corp.'s Microsoft Works and Microsoft Mail; Claris Corp.'s MacDraw Pro for panel

layout; and Microsoft's PowerPoint for presentations.

**ARCHITECTURE:** Laptops link into an Ethernet network at the office; the field sales force relies on Shiva Lanrovers and an Ethergate using AppleTalk remote access. Desktops are linked to Ethernet via 10Base-T.

## THE BOTTOM LINE

### MCDONNELL DOUGLAS HELICOPTER SYSTEMS IN THOUSANDS

#### CUMULATIVE INVESTMENT

'92-94\* \$227.7

#### CUMULATIVE RETURN

'92-94\* \$837.9

#### PAYBACKS

- Saved labor
- Rework errors avoided

**FIVE YEAR ROI = 628%**

*ROI = (total returns - recurring maintenance and operations cost) ÷ nonrecurring hardware, software and development costs.*

*Source: Chicago Research and Planning Group*

*\*Data only available for 30 months since implementation in 1992*

The marketing group turned to information technology to cope with changing business conditions. "Like other aerospace companies over the past few years, we were going through some downsizing, shifting our focus away from defense and toward the commercial sector," Neugebauer explains. The only way a smaller staff could handle the increased marketing demands of catering to discerning customers was with technology, he adds.

It was also an opportunity for IS to make a big move to PC-based distributed computing. According to Director of Information Technology Andy Miller, MDHS was primarily a mainframe shop that designed and implemented systems on a three-year schedule. Taking an initial concept through an iterative process and delivering a system with quantifiable benefits relatively quickly was an opportunity, says Miller, "to build credibility among our internal customers."

One important factor was Neugebauer's sponsorship role. As a representative from marketing, he was responsible for defining user requirements and confirming design. The system required data from contracts, business operations, engineering and manufacturing, and Neugebauer also was instrumental in promoting collaboration among the multiple business units. The fact that the system was implemented in only seven months is attributable to having an end-user champion driving the project, says Miller.

Now, producing quotes—which used to take hours and

offered little payback from window-shopping customers—can be determined in a customized document as a matter of course. "Customers are equipped with customized information when they're ready to buy," says Neugebauer. "The more customers know, the better it is for customer relations."

The system has been going full throttle since November 1992. During the subsequent three years, the sales staff wrote 492 purchase agreements and made 158 sales. Increased productivity and streamlined sales cycles have saved the company more than \$600,000. From initial customer contact to approval, the sales cycle now averages around eight days, down 83 percent from before. In fact, in one day alone in 1994, a salesperson churned out 16 purchase agreements—the equivalent of the company's annual production of a new model in its first year. MDHS's worldwide sales staff was cut from 74 to 18, yet nearly four times the number of purchase agreements are produced per employee. And the documented savings represent only a fraction of the real return, according to company officials. "It's difficult to quantify the financial impact of being more responsive and conveying a professional image," says Neugebauer, "but customers are impressed by the fact

that none of our competitors have a system like ours.

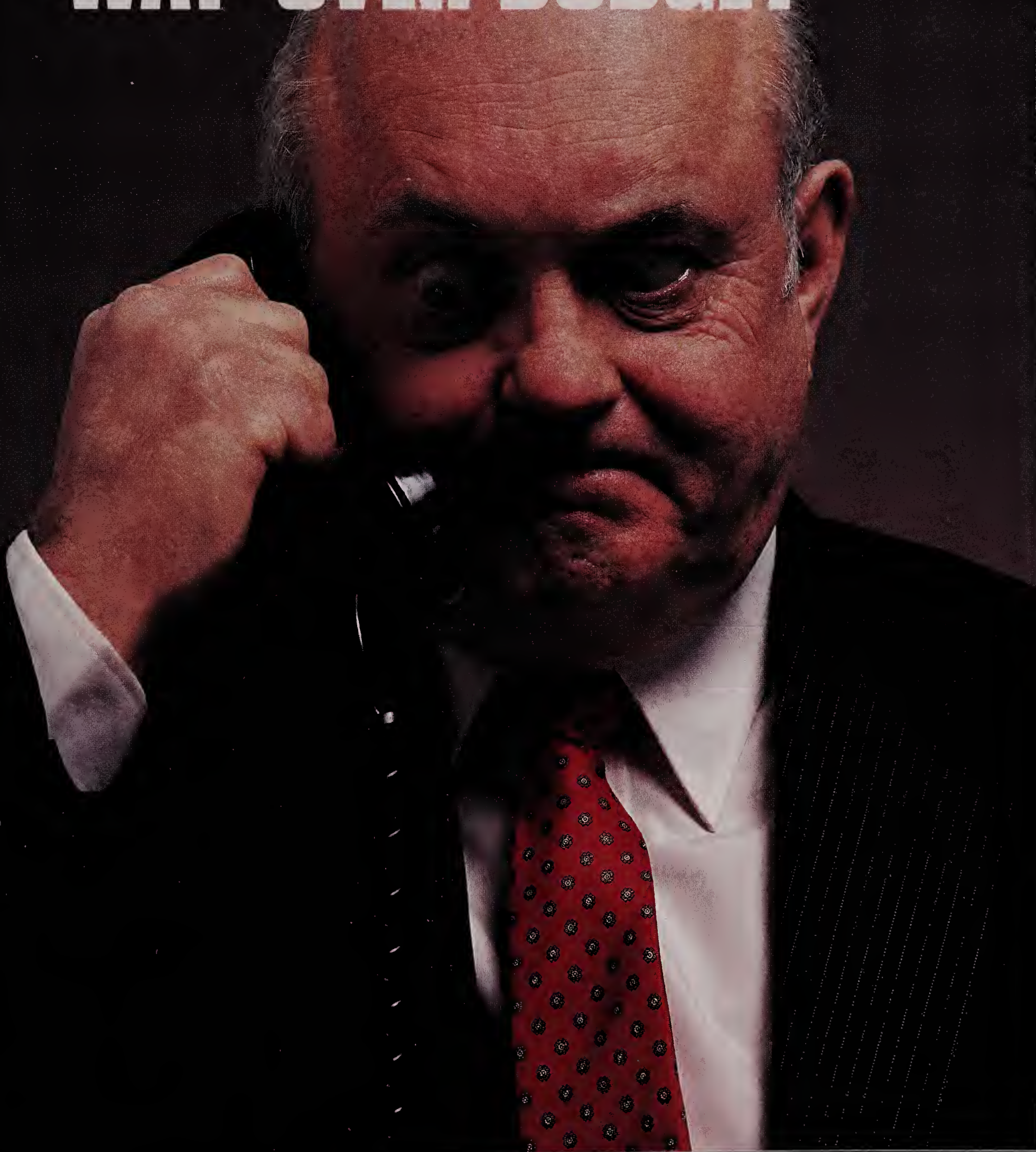
The electronic configuration capabilities capture expert knowledge and eliminate mistakes in terms of pricing and rules-based configurations. Purchase agreement revisions can be accomplished line by line; updates are automatic, and retyping isn't required. And the laborious process of reviewing agreements by committee is a remnant of the past; only special circumstances such as discounts or non-standard options are subject to review.

Two new product lines have been introduced without adding administrative or sales staff, something that MDHS officials acknowledge would not be possible without the system. Neugebauer also credits the system with landing an \$18 million deal with the Mexican government because MDHS was able to respond quickly and make changes on a very tight schedule. And customers now can choose from more than 650 options.

Developing the system was a positive experience for the IS group. "The whole dynamic of how systems are developed has changed," says Miller. "Previous implementations were practically adversarial because the business units felt we were forcing a solution on them." The electronic marketing system is proof that IS and business can coexist peacefully and develop value-added systems. **CIO**

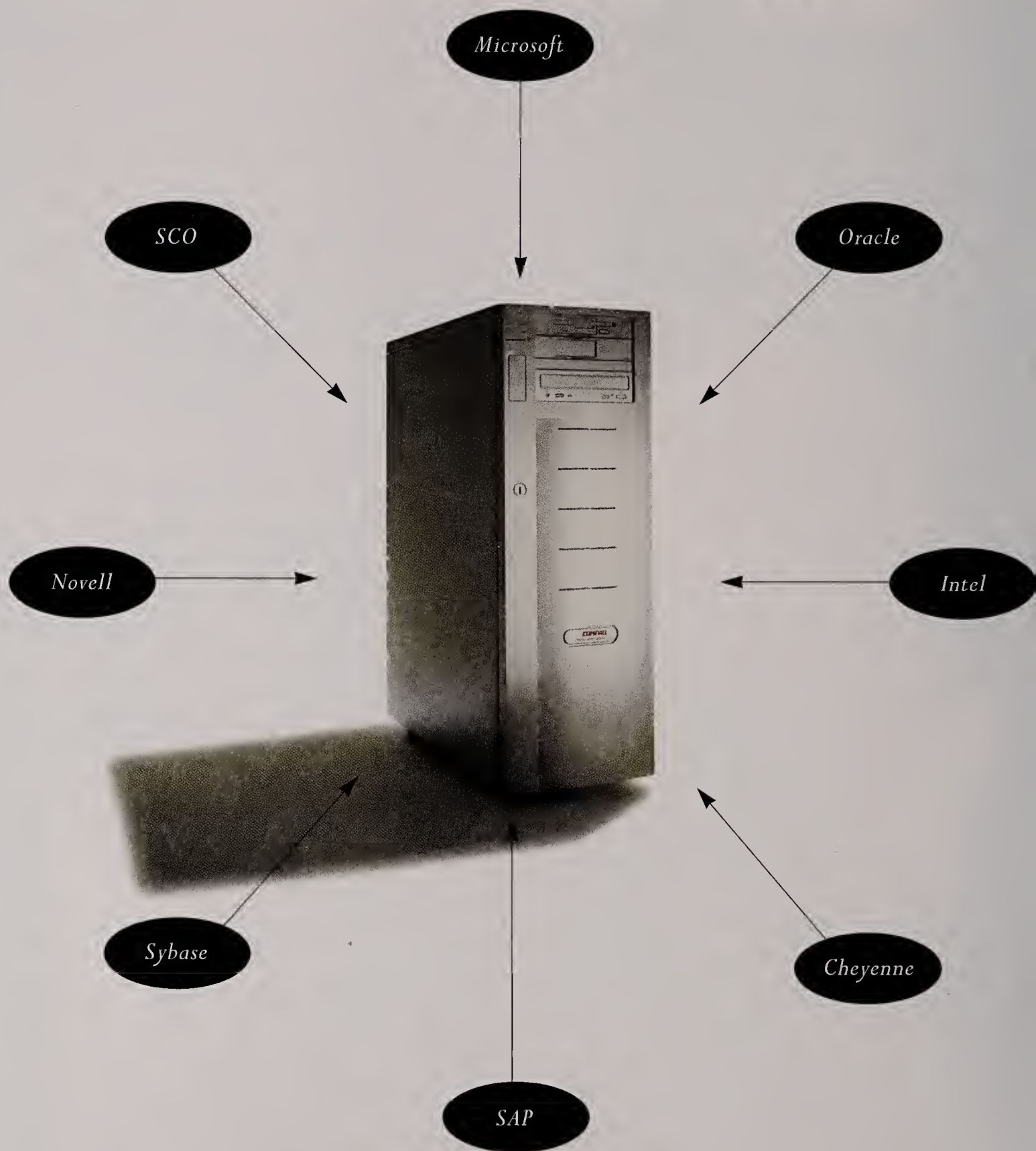
*Megan Santosus can be reached at [santosus@cio.com](mailto:santosus@cio.com).*

**“YOU’RE ALREADY  
WAY OVER BUDGET”**



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SOLUTIONS



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**COMPAQ**

Has It Changed Your Life Yet?

# A Speedy Recovery



Even small mistakes in patient care can have enormous consequences. So Brigham & Women's Hospital developed a computer medical order entry system to warn staff before problems happen.

BY PETER FABRIS

**B**righam & Women's Hospital is one of Boston's leading teaching hospitals, a Harvard Medical School affiliate and the recipient of three Nobel prizes. So when the results of a 1991 survey revealed that 6.5 percent of its patients were likely to experience an "adverse drug reaction event" during treatment, the hospital's proud medical staff was "morally appalled," recalls John Glaser, formerly vice president of the hospital's information systems. Although the finding was consistent with industry norms, Brigham & Women's staffers had assumed that their institution's performance was much better than average. "The 'only average' showing was fundamentally counter to our physicians' medical ethics and standards," says Glaser, who is now vice president and CIO of Partners HealthCare Systems Inc., an integrated health care system founded by Brigham & Women's and Massachusetts General hospitals.

Even the best and brightest can sometimes fall short of perfection. Consider that Brigham & Wom-

en's doctors have 2,500 medications, 1,100 laboratory tests and 150 radiology procedures at their disposal. To master all of the subsequent treatments would "defy human cognition," says Glaser. The most experienced, conscientious and well-trained physician might order an unnecessary diagnostic test or, worse, overlook the fact that a patient is taking a medication that reacts badly with another drug. Errors can increase when doctors are dealing with infrequently prescribed drugs and tests. Add other opportunities for procedural missteps—misread notes caused by sloppy handwriting, inaccurate oral communication or orders routed to the wrong department—and the margin for error widens still more.

Not that every bad reaction to medication is the hospital's or doctor's fault. Less than one percent of hospital patients actually experience significant harm due to a hospital's mistake, says Glaser. Yet even a small mistake can have a real cost in terms of anguish and dollars. So the hospital developed a computer medical order entry system that reduces mistakes by flagging potentially dangerous prescription orders and redundant tests. Though the system has increased the workload for physicians by 20 to 30 minutes a day in time spent typing treatment requests, the hospital has found the resulting benefits compelling enough to insist on its use.

Implemented in 1993, the hospital's Provider Order Entry System (POES) acts as a check and balance on doctors' orders. On an average day, Brigham & Women's doctors enter 4,000 medica-

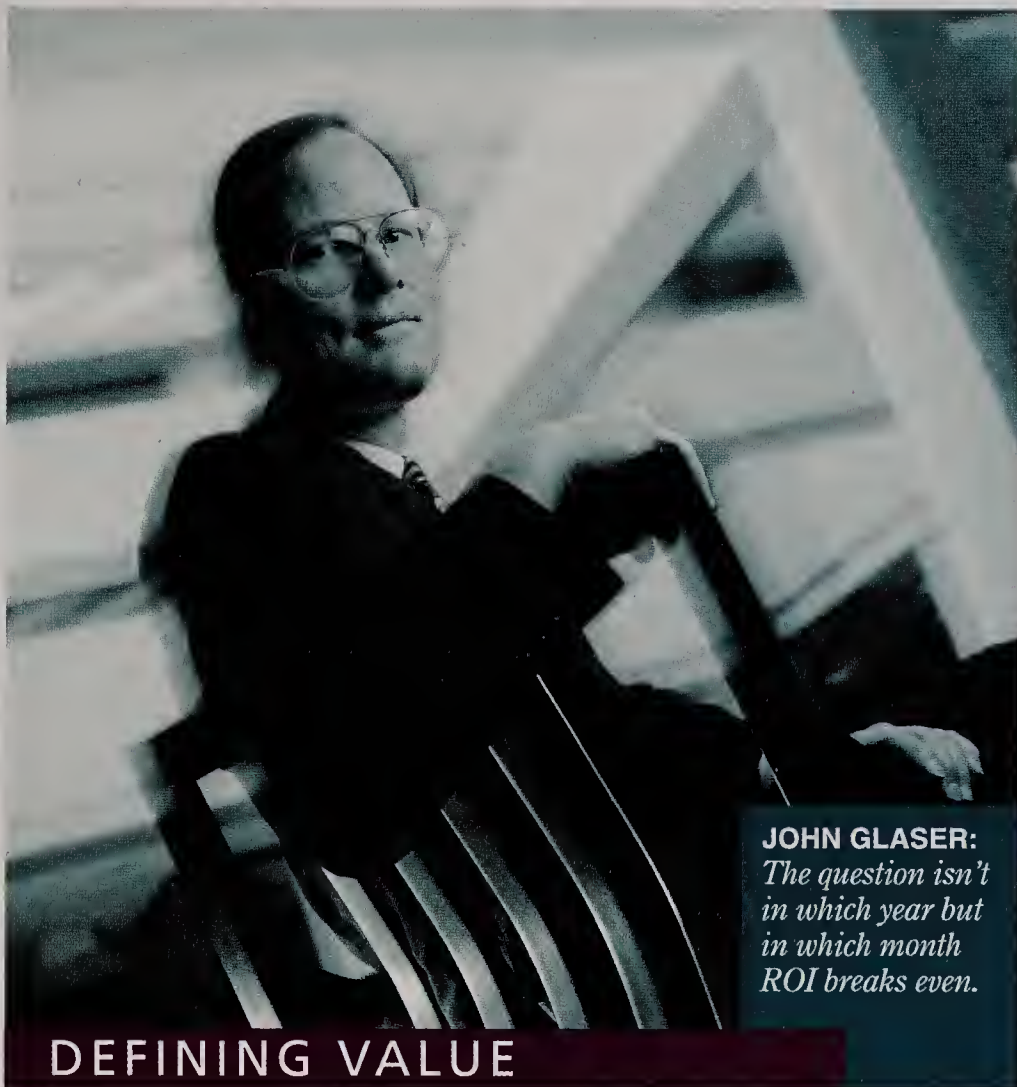
tion orders. The system warns of potential adverse reactions in an average of 29 of those cases, says Glaser. Sometimes doctors decide that the benefits outweigh the risks and go ahead with the order, but about 14 of those 29 red flags result in physicians canceling an order. Some 320 of those 4,000 drug orders prompt the system to remind doctors that the patient is already receiving the medication. Doctors cancel about a third of those orders.

In addition to preventing mistakes, the system's "event engine" proactively reminds doctors and nurses to perform certain procedures based on accepted treatment schedules. For example, it might prompt nurses to make sure that a patient recovering from surgery gets out of bed three times a day. The system "constantly searches for things that ought to be done," says Dr. Thomas Lee, co-director of the hospital's Clinical Initiatives Development Program.

For example, if John Doe's blood test shows low potassium levels coupled with the presence of the medication Digoxin, the system would indicate upon receiving the test results that the patient may be at risk of heart problems.

Doctors can also enter reminders to themselves (e.g., "Check Mrs. Sweeney's mammogram results in two weeks"), and the system will automatically prompt them when they log on each day, says Lee. The benefits of this automatic early warning system are readily apparent. "It helps doctors, nurses and other staff to perform better and make smarter decisions," Lee says.

**W**hile POES's first aim is to improve patient care, it can actually help to reduce health-care costs as well. By preventing adverse drug reactions—which can lengthen a hospital stay and recovery period for a patient—the system



**JOHN GLASER:**  
*The question isn't  
in which year but  
in which month  
ROI breaks even.*

## DEFINING VALUE

The hospital's Provider Order Entry System (POES) acts as a check and balance on doctors' orders for medication and tests and warns of potential adverse reactions. POES's aim is to improve patient care, but in doing so it helps to reduce health-care costs as well.

saves \$1.5 million annually, according to hospital estimates. POES also saves an estimated \$100,000 by reducing unnecessary tests (a hospital study completed before the design phase estimated that 35 to 50 percent of ordered clinical tests were redundant or otherwise unnecessary). Brigham & Women's estimates that taking soft benefits into account, the system contributes \$5 million to \$10 million to the bottom line annually.

## ANATOMY OF THE SYSTEM

**HARDWARE:** The system runs on 4,800 Intel Corp. 386-and 486-based Compaq Computer Corp. and Hewlett-Packard Co. clients and 162 Compaq database servers. It is the largest health-care client/server architecture in the world.

**SOFTWARE:** The proprietary Patient Order Entry System (POES) was developed using InterSystems Corp. Open-M programming language and network operating system. Novell Inc.'s Netware manages the network activity.

**NETWORK:** The networking hardware consists of an IBM Corp. Token Ring and two backbone rings.

Prior to POES, all medical directives were given orally or on paper. "In the old days, all you had to do was say to a nurse, 'Let's get a chest X-ray,'" Lee says. "That was very convenient for doctors. Now they have to document what they want." The inconvenience took some adjustment, but the system also offered a new benefit: remote access. "Now you can write orders from anywhere; at home, even in an airplane." Lee says.

Although some doctors are uncomfortable with computers and have had difficulty learning the system, it is easy to use for most, Lee insists. "There's no manual, and you don't need one." In general, younger staff members, who have more experience with computers, find it easier to use. In fact, Lee says some intern applicants are attracted

close collaboration with doctors, nurses, and pharmaceutical staff was key to POES's success, Lee says. The system encompasses 310 medical event rules that guide treatment, and IS staff programmed common treatment methodologies, including tests and medications for scores of medical conditions, in close consultation with medical personnel. That collaboration continues as IS staffers constantly review and revise the rule-based system using input from doctors.

The \$1.5 million system costs about \$470,000 to maintain each year (including staff salaries and capital expenditures). But with \$5 million to \$10 million in total annual savings, the system has quickly paid for itself. "The question isn't in which year ROI breaks even, but in which month," Glaser says. With continued system improvements, ROI should continue to rise.

POES is written in InterSystems Corp.'s Open-M, a programming language and network operating system. Glaser's team examined some off-the-shelf options, but none met their criteria so the system was developed wholly in-house. The client/server system uses Intel Corp.-based Compaq Computer Corp. and Hewlett-Packard Co. machines and includes 4,800 clients and 162 servers. It is the largest health-care client/server architecture in the world.

Security is an important consideration when dealing with sensitive medical information, so Glaser's team carefully crafted a password component restricting access and ensuring that only doctors can issue orders. Others have limited access. For example, medical students suggest treatments online, but a doctor must give approval before they are carried out. Personnel in the hospital's labs, pharmacy and radiology areas receive orders electronically; that eliminates misrouting of paper slips and the need to contact a doctor to confirm barely legible scrawl. To further increase security, each user has a five-character log-on password that changes every six months.

POES might be a revenue source for Brigham & Women's before long. The software enables constant refinement of

the medical rules, giving it the flexibility to be adapted by other hospitals. Glaser says Brigham & Women's has had discussions with other health-care institutions about selling POES but has made no deals. Any income from sales would be a bonus, but the system has already proved to be an effective prescription for quality and value. **CIO**

Peter Fabris can be reached at pfabris@cio.com.

## THE BOTTOM LINE

### BRIGHAM & WOMEN'S HOSPITAL IN MILLIONS

| INVESTMENT | RETURN* |
|------------|---------|
| '93 \$1.97 | \$2.1   |
| '94 \$.47  | \$2.1   |
| '95 \$.47  | \$2.1   |

#### PAYBACKS

- Increased productivity
- Better medication utilization
- Increased accuracy

### FIVE YEAR ROI = 326%

*ROI = (total returns - recurring maintenance and operations cost) ÷ nonrecurring hardware, software and development costs.*

*Source: Chicago Research and Planning Group*

*\*Based on most conservative estimates*

to the hospital partly because of its sophisticated IT. (In addition to developing the order entry system, Glaser was one of the pioneers in implementing an enterprisewide client/server system [see "A Successful Operation," June 15, 1995]. He recently won a Carnegie Mellon/AMS Achievement in Managing Information Technology Award for his efforts.)

The IS staff's internal medical expertise (several IS staffers have both medical and computer degrees) and



# "NO MORE EXCUSES. FIX IT!"

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# Power Launch



The advent of a new document storage system at Rockwell International shaved weeks off space shuttle schedules and saved the company—and NASA—an astronomical sum

BY CAROL HILDEBRAND

**I**n other news, NASA reports that today's scheduled shuttle launch had to be scrubbed because of an engineer's question about a shuttle component. Takeoff will be delayed at least three days while file clerks pull the correct drawing of the part from the warehouse and deliver it to the engineer. That filing system is pretty expensive when you consider that it costs \$1 million a day to keep the shuttle on the launching pad."

This news report may sound unlikely, but five years ago it was not as far-fetched as one might think. Each of the shuttle's umpteen-thousand parts requires engineering, manufacturing, assembly and maintenance drawings; many of these drawings are updated through change orders, which add still more paper to the process. For the \$1.3 billion shuttle program at Rockwell International Corp.'s Space Systems Division, a NASA supplier, that adds up to more than one million drawings—a filing and maintenance nightmare. Just pulling one document from the reams of paper associated with the shuttle project could take several days; a multitude of such

events typically added weeks to the shuttle launch cycle and wasted an astronomical sum of money.

But SSD has used information technology to jettison its document filing warehouses, known as "print cribs," and save millions of dollars for itself and NASA. Using the company's Document Storage and Retrieval System (DSRS), a multisite document archival database, engineers can immediately access any drawing they need from

their desktops. DSRS has shaved the shuttle launch schedule from 6-8 weeks to 4-6 weeks. NASA was so impressed with the system that it is requiring other suppliers to place engineering drawings and other information on DSRS.

SSD's application grew out of the harsh economic conditions that have plagued the aerospace industry for years. As defense dollars dried up, organizations like Rockwell SSD faced tougher competition for the remaining contracts. In the late '80s, "the company lost a number of major contracts," says K.S. "Radha" Radhakrishnan, director of SSD's information management division. "And we mostly lost them because of cost issues. It made us do some soul-searching," Radhakrishnan says.

Working with a consultant, Radhakrishnan's information management group spent about a year looking for ways to eliminate redundant and labor-intensive manual work from SSD's business processes. The most obvious avenue was a soup-to-nuts overhaul of how SSD created, used and maintained the vast library of paper that accompa-

nied each project. Since the shuttle program was SSD's biggest project, the group began there.

**S**huttle drawings were stored in print cribs at Rockwell in Downey, Calif., the Johnson Space Center in Houston, and the Kennedy Space Center in Cape Canaveral, Fla. Almost everything was designed on paper and stored in the cribs, but the several-day wait to get a particular drawing out of storage meant that many sites, from design groups to manufacturing plants, kept "shadow cribs"—private libraries of drawings that did not necessarily contain the most recent changes. Thus if a worker on the assembly line had a question about a component's design, he could either try to find something in the local unofficial crib or delay production until the correct drawing arrived from the official print crib. Finding an up-to-date document quickly "all depended on how lucky they were," says Senior Engineering Specialist Art Mena. Neither choice was particularly palatable.

Neither, unfortunately, were the technology choices once the development team started examining what the creation of an on-line database would entail. Radhakrishnan, working with Mena and lead engineer Saro Ghazarian along with folks from engineering and manufacturing, came up with a pretty clear idea of what they wanted: optical storage media (since it was cheaper than more traditional storage media) with a database engine that provided up-to-date information and actual drawings over multiple platforms, and scanning capabilities to bring paper drawings online. The system also had to link to a mainframe-based application that contained metadata about the drawings such as official sign-offs on completed drawings. The group solicited re-



**K.S. "RADHA" RADHAKRISHNAN (l.), TONY ROSS, SARO GHAZARIAN and ART MENA:** After a frustrating first go-around, the team chose to rewrite the software in-house from scratch.

## DEFINING VALUE

Rockwell's Space Systems Division created an electronic storage and retrieval system that replaced its document warehouses, saved millions of dollars for itself and NASA and will make millions of design drawings accessible to engineers from their desktops.

quests for proposals from about six companies, "but none truly had all the components we needed," says Radhakrishnan.

So the group narrowed its focus to concentrate on storage and scanning modules, the two most important items, and went with Docuvision from IA Corp. in Emeryville, Calif. Then, says Mena, they spent almost a year scanning drawings, structuring the Oracle Corp. database that would link to Docuvision and building in tools that would work on any platform. "If a guy working on a PC made an annotation to a drawing, we wanted the guy on a Sun workstation to be able to see it," he says.

## ANATOMY OF THE SYSTEM

**HARDWARE:** The system runs on Sun Microsystems Inc. file servers at each site. Users can access the systems from PCs, or any platform running Windows, X Windows or an HTML browser. The documents are stored on an NKK Electronics America Inc. optical jukebox, and a Sun SPARCserver 690 manages the stor-

age program. Several scanners are used to enter legacy paper documents onto the system.

**SOFTWARE:** The custom-written DSRS software includes StorageSync, a program that handles drawing updates to the optical and database systems and synchronizes intersite updates, and Rule Proces-

sor, a general-purpose server program that manages database connectivity. Rockwell also developed code to decompress and display the drawing images at the workstation and various quality control programs for the software. The application also uses an Oracle Corp. database and database management system.

## THE BOTTOM LINE

### ROCKWELL'S SPACE SYSTEMS DIVISION IN MILLIONS

| INVESTMENT  | RETURN  |
|-------------|---------|
| '93 \$1.750 | \$2.592 |
| '94 \$1.357 | \$2.772 |
| '95 \$.937  | \$2.994 |
| '96 \$.908  | \$3.266 |
| '97 \$.979  | \$3.541 |

#### PAYBACKS

- Eliminated personnel
- Reduced storage space
- Increased productivity of engineers

#### FIVE YEAR ROI = 361%

*ROI = (total returns - recurring maintenance and operations cost) ÷ nonrecurring hardware, software and development costs.*

*Source: Chicago Research and Planning Group*

But all the preparatory work was still not enough. The system went live in the middle of 1991, and "the next couple of years were an absolute nightmare," says Radhakrishnan. System Administrator Tony Ross says the development team just expected more from the system than it could deliver. "We totally underestimated network traffic, for one thing," he says. "Then the optical jukebox was not designed for the storage load we ended up with. This was early technology, and it just physically could not hold up under the pressure of usage."

**F**aced with mounting user frustration, Radhakrishnan's team decided to draw on the in-house experience they'd been collecting for three years and rewrite the software from scratch. They wanted to get away from the rigid structure imposed by Docuvision and create a more modular, flexible system that would accept user-mandated changes more easily. The revamp took all of 1993 and most of 1994. The team pulled the plug on the old system on Halloween

could retrieve information about wiring, assembly sequences, etc., by pulling up the drawings on PCs on the factory floor.

**Now, any system user can get a drawing as soon as it's officially released from the engineering drawing system. The IS group gets the drawings from the system at 6 p.m. every evening, and the databases are updated within two hours.**

Other NASA shuttle suppliers are scrambling to get their drawings on the system. "One company produces drawings of configurations of the crew compartments. There are a lot of drawings, and they change rapidly, so they've been hounding us to put their drawings on the system," says Radhakrishnan. He says they were testing a distribution program for those drawings as of late 1995.

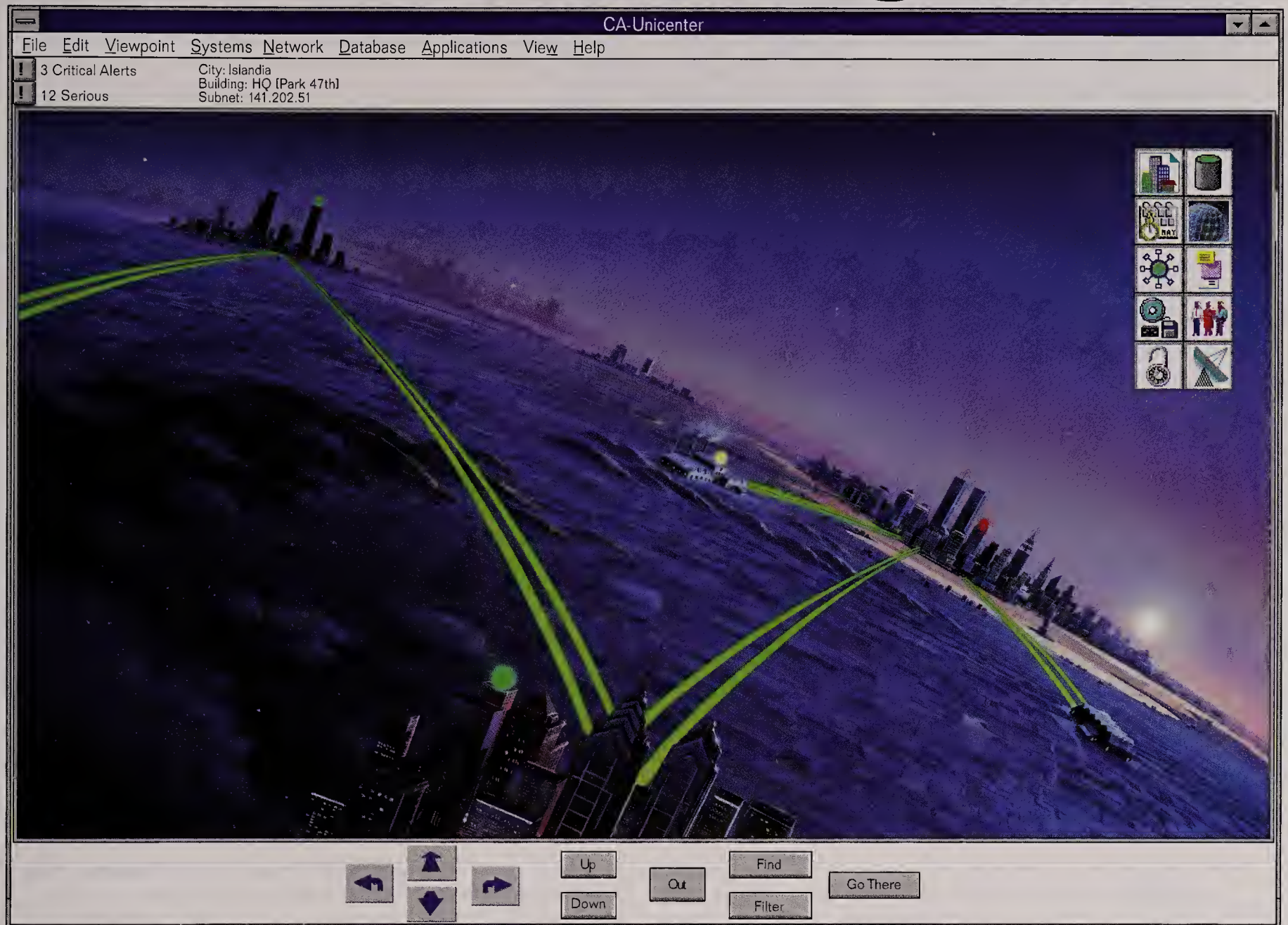
What's more, Radhakrishnan says his team has expanded the system to other uses beyond drawing archival. Now that they've hit production mode for this expansion, "we have two years of financial reports available, and you can get it off the Web server. It was the intent of this system from day one that it could be a document storage and retrieval system for any type of information." **CIO**

Carol Hildebrand can be reached at [cjh@cio.com](mailto:cjh@cio.com).

1994. User approval ratings hit the roof, says Radhakrishnan, who credits the team's heavy reliance on prototyping during development with ensuring that the system really met users' needs. The team also made user access to the system much simpler. Engineers can log onto DSRS through Windows, an X Window system and a new Web interface that Mena says has proved quite popular. Now, any system user can get a drawing as soon as it's officially released from the engineering drawing system. Mena says the information systems group gets the drawings from the system at 6 p.m. every evening, and the databases are updated by 8 p.m. All the drawings are stored at all three sites—Downey, Kennedy Space Center and Johnson Space Center—to satisfy shuttle program disaster recovery requirements.

DSRS benefits SSD both through cost reduction and productivity gains. The company saved about \$1.3 million through closing the print cribs and eliminating associated support personnel. SSD estimates that for every dollar spent on DSRS, the company saves more than three dollars by using it. The company also brought in modifications to the shuttle orbiter ahead of schedule and below projected costs, mainly because technicians

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UNITED HEALTHCARE

# A Bargain at 15 Cents



In the pricey world of health care, what can you get for 15 cents? United HealthCare found out when it deployed artificial intelligence and cut the cost of each claim review to three nickels

BY ANNE KNOWLES

**E**ver since Bill Clinton took the oath of office, health care has been a key political issue in the White House, Congress and in most American living rooms. The consensus says skyrocketing costs are the problem and that containment is the solution. But not everyone agrees who is to blame. Depending on who is doing the finger pointing, the culprits are overpaid physicians, inefficient government programs like Medicare or bloated health-care insurers. United HealthCare Corp. is one insurance giant striving to stay trim; thanks to its AdjudiPro artificial intelligence system, the company shed an estimated \$13 million in claims processing costs last year.

Founded in 1974, the Minnetonka, Minn., company is at the forefront of the rapidly growing field of managed health care, an approach that seeks to control medical costs by setting fees, monitoring procedures and emphasizing preventive care. Primarily an insurance company, United HealthCare also operates health maintenance and preferred provider organizations, among other services. Under an ag-

gressive acquisition program, company revenues have soared from \$412 million in 1989 to an expected \$9 billion for 1995. But like any fast-growing corporation, especially one in the eye of the health-care storm, United HealthCare needs to control costs.

An important part of the cost equation is the Medical Loss Ratio (MLR), a business metric that measures medical costs as a percentage of premium revenue. If 80 cents of each premi-

um dollar is used to cover medical expenses, for example, the MLR is 80 percent. In 1989, United HealthCare's MLR was in the 80 percent range, and the company wanted to lower it to the 70s. "The mid-70s is good. Below 70 and you wonder if enough services are being delivered," says United HealthCare Senior Vice President Kathy Walstead-Plumb.

In 1989, James P. Bradley was brought in as CIO and charged with bringing information technology to bear on the MLR. "Health-care IT needs to move up the value chain from administrative to clinical," says Bradley, who recently left the company to become president of Health Systems Integration Inc. in Minneapolis. To provide higher-value functionality such as claims review, systems need to leverage clinical rules, he says. And that requires artificial intelligence.

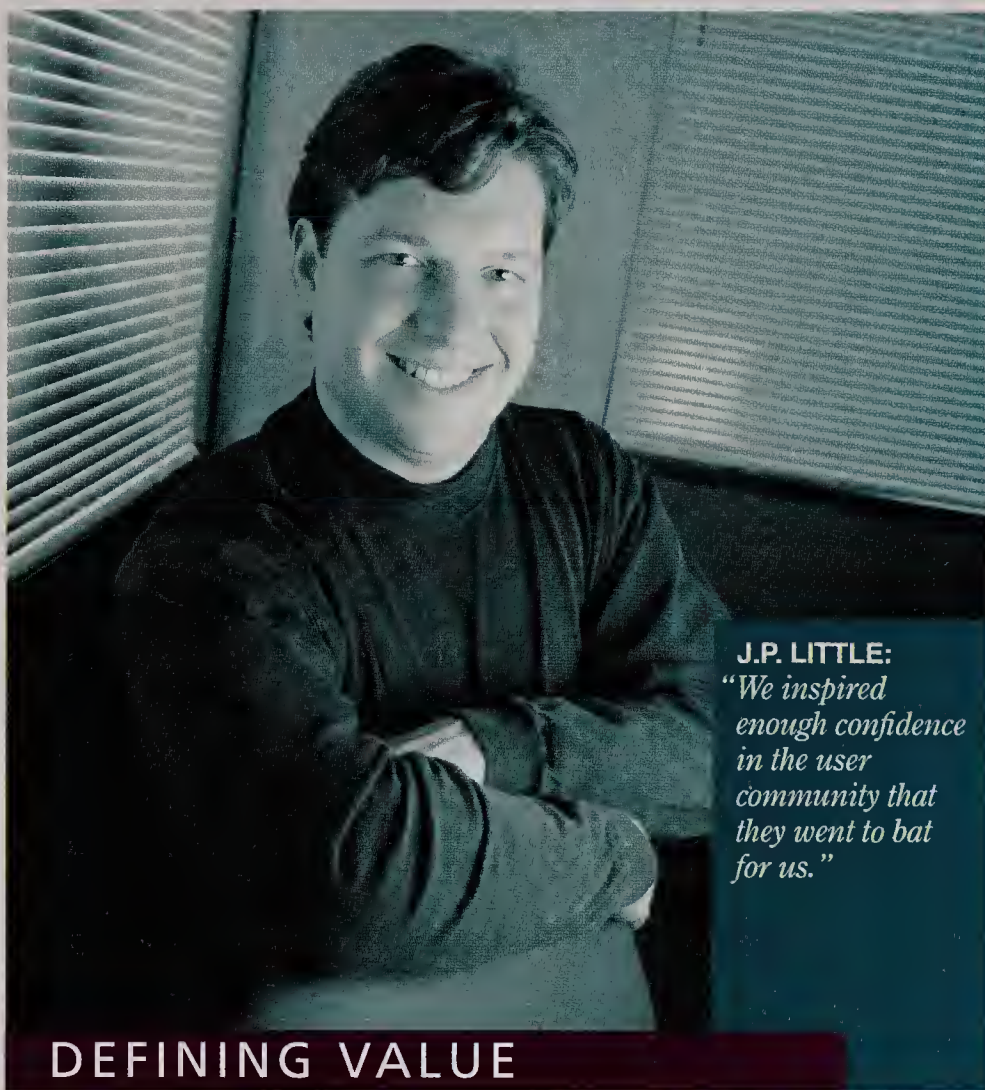
An insurance claim that is not immediately classified as payable undergoes adjudication or review. Simple claims are handled by claims processors, and more complex claims are dealt with by medical

analysts who are registered nurses. These reviewers determine which billed services are covered and how much the company will pay based on strict but ever-changing American Medical Association guidelines. An AI system would use preprogrammed rules to make the same sort of payment decisions at far less cost. For example, the insurer may have a rule that denies payment for postoperative office visits. As office visit claims come in from a subscriber, the AI system would search the patient's record before approving payment to determine whether the office visit is linked to a past surgery.

To explore the possibilities of AI in adjudication, Bradley turned to J.P. Little and David Williams, application programmers who had recently earned master's degrees in AI but had never managed a corporate AI project. Bradley established a separate unit—the advanced technology department—and gave them free rein. “We kept them out of the mainstream with the idea that they could ask forgiveness, not permission,” he says. Little and Williams, director of advanced technology and development manager, respectively, and four or five other programmers began developing a system that would become known as AdjudiPro.

The first phase of the project was difficult for two reasons. First, the programmers depended on cooperation from the RNs to help them identify the 1,000 to 2,000 rules the system would need to operate. They also needed the nurses to help design the look and feel of the application. Little, in charge of the project, had programmed in isolation at his previous job and learned his lesson. “We had wonderful software and no one wanted it,” he says. “I vowed then to never again do application development in a vacuum.”

But it wasn't easy for programmers and RNs to understand each other. “There was a period when we did a lot of talking because they didn't know what they were looking



**J.P. LITTLE:**  
“We inspired enough confidence in the user community that they went to bat for us.”

## DEFINING VALUE

An artificial intelligence system automated much of United Health-Care's manual claims review process, drastically reducing the cost per claim reviewed and freeing registered nurses to turn their attention to higher-level analysis.

for, and neither did we,” says Jean Toftely, an RN and former medical analyst supervisor who now works exclusively as a business analyst for the IS department. “I couldn't understand the idea of a computer doing my job.”

That was the source of the second problem: The medical analyst RNs were afraid that AdjudiPro would make them obsolete because its initial goal was to take over many of the review duties of the medical analysts and

## ANATOMY OF THE SYSTEM

**SOFTWARE:** Unix components developed in C; Unisys mainframe application components developed and maintained in Xgen, a 4GL that generates Cobol. Knowledge bases developed using Template Software Inc.'s Snap Object Modeler 6.0. Servers built using DCE-compliant tools from Open Environment Corp.

**HARDWARE:** Development done on IBM RS/6000 and Unisys A17 mainframe. Production system runs on RS/6000 Model 590 with 256MB of memory.

**ARCHITECTURE:** Application works in conjunction with proprietary Cosmos application, COMS transaction processor and DMS-II databases

running on Unisys A19 mainframe. Communication between the mainframe and the RS/6000 workstation occurs via TCP/IP, File Transfer Protocol and an in-house developed routing protocol.

claims processors. Understandably, the nurses were wary. "There was some concern about being automated out of a job," says Toftely.

Instead, thoughts of replacing nurses were scrapped when it became clear that automating claims would free RNs to do more complex reviews involving patterns of care. "The nurses would do more of the investigative research work to find new trends and no longer spend time on routine claims," says Walstead-Plumb. In addition, United HealthCare's explosive growth during the development period made layoffs of the clerical processing staff impractical.

many mainframe CPU cycles, so the Unix components were offloaded to an IBM RS/6000 590 running AIX, IBM's version of Unix. The RS/6000-based components are fully integrated with Cosmos; shared data is transferred via TCP/IP, File Transfer Protocol and a transaction-routing protocol.

AdjudiPro operates in a continuous loop, basically creating a reviewable claims list from data extracted from Cosmos, processing as many of these claims as possible and then building the next list. Once a day, the system copies logs and report information from its working files to archive files.

Today, AdjudiPro handles over half of the company's claims reviews, processing completely or in part 1 million reviews per month. The purely administrative claims and the exceptionally complex are routed to claims processors and medical analysts, respectively, while the system handles reviews that fall between these extremes. Of all the claims the system attempts to resolve, only 3 percent are bumped back to medical analysts because they prove too complex or incomplete.

Since AdjudiPro did not result in layoffs, the return on the five-year, \$3.4 million investment comes primarily from reduced processing costs. AdjudiPro's claims cost 15 cents to process versus \$1.23 for manual processing. The savings added up to approximately \$9 million in 1994 and, at press time, an estimated \$13 million for 1995. The savings has also contributed to reducing the medical loss ratio to 78 percent.

In addition to reducing expenses, AdjudiPro has also fostered the company's ongoing acquisition strategy and in some cases helped clinch a deal. In 1992, for example, United HealthCare wanted to buy two Ohio-based health plans, but Cosmos could not support the companies' sophisticated cost containment review systems. However, the ability to integrate them with AdjudiPro made the acquisition financially sound.

AdjudiPro's success has spawned two other AI endeavors. The first, begun in 1993, is intended to reduce payouts for billing errors, abuse and fraud from 10 percent to between 6 and 8 percent a year. A second project, eight months old and code-named Neptune, will use fuzzy logic to do profiling for disease and condition management. Says Little: "AdjudiPro has unquestionable value in the eyes of senior management, and we are always thinking of other ways to use the technology." 

Anne Knowles is a freelance writer based in Brookline, Mass.

## THE BOTTOM LINE

### UNITED HEALTHCARE IN MILLIONS

| INVESTMENT  | RETURN  |
|-------------|---------|
| '90 \$.149  | \$0.00  |
| '91 \$.438  | \$0.00  |
| '92 \$.651  | \$.330  |
| '93 \$1.041 | \$5.852 |
| '94 \$1.156 | \$8.821 |

#### PAYBACK

- Lower-cost claims reviews

### FIVE YEAR ROI = 434%

*ROI = (total returns - recurring maintenance and operations cost) ÷ nonrecurring hardware, software and development costs.*

*Source: Chicago Research and Planning Group*

Once the staff was reassured and a prototype of AdjudiPro had proved it could process claims correctly, nearly everyone endorsed the system. "That was the key moment in the project," says Little. "We inspired enough confidence in the user community that they went to bat for us."

The original plan was to deploy AdjudiPro and its hefty rule-filled knowledge bases on the company's Unisys Series A19 mainframe, which also runs Cosmos, the company's core claims administration application. Once AdjudiPro was up and running, it required too

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GENSYM CORP.

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BY CAROL HILDEBRAND

*"Press one for sales. Press two in a hopeless effort to get technical support. Press one for answers to questions you don't have. Press two if you're gullible and pessimistic. Press two if you're willing to buy something just so you can talk to a human being."*

*—From the comic strip Dilbert*

**Y**ou have to figure that once a topic surfaces in *Dilbert*, it's pretty much part of mainstream corporate gestalt. And if dealing with software technical support drives even that mild-mannered engineer to threaten his phone with a hammer, imagine what the rest of corporate America would like to do to the typical software help desk. But Gensym Corp., the Cambridge, Mass.-based software developer of intelligent systems, is an exception. The company's help desk system is so effective at helping employees solve customer problems and fix bugs in products, it might even still Dogbert's rampant cynicism.

For a small company (Gensym employs 225 people and has revenues of about \$20 million), making customers happy is more than just a worthy goal—it can be a make-or-break proposition. The help desk spreads customer service throughout the company by centralizing data on sales and product support and by providing a tracking system for that information: Support engineers can field customer

questions, developers can tap into customer feedback and salespeople can alert developers about desired software enhancements. Employees can even draw on this shared pool of knowledge about Gensym's customers to fix problems before customers call to complain.

"It's all about leveraging knowledge about our customers," says Troy Heindel, Gensym's vice president of support services and CIO. "It's how we capture organizational memory."

The help desk system has saved Gensym money as well. For example, support engineers can now handle about seven calls a day, up from four calls three years ago. Company executives say they were able to forgo adding an estimated two and a half support engineer positions as a result and that the help desk will earn a 43 percent return on investment over five years based solely on increased productivity. But more important, the system has helped the company improve the quality of its software and boosted its customer service reputation, says Chairman and CEO Lowell Hawkinson. For example, he says version 4.0 of the company's flagship G2 software, a product that earned Gensym a spot on *Fortune's* Web site list of "25 Cool Companies," took three months to reach the same level of quality that version 3.0 took a year and a half to attain, and customer problems are solved on average in a day and a half, down from a previous average of two and a half days. The company's customers seem to agree with Hawkinson: Gensym's customer service was ranked number one in the expert-system category, according to a 1995 reader's poll by *Control* magazine.

The application works by linking almost any func-

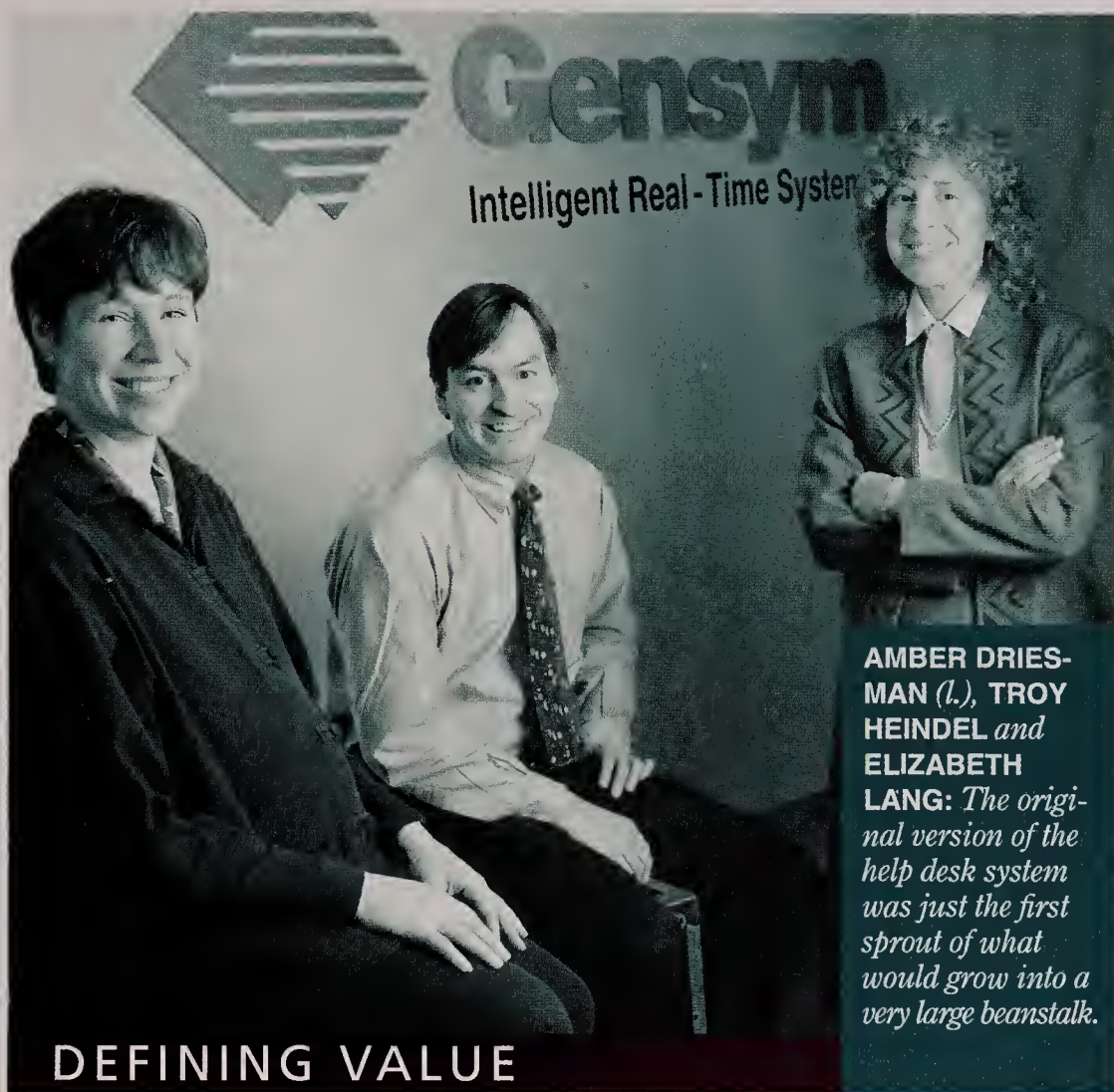
tion that supports Gensym's customers into a central repository containing such wide-ranging information as names and addresses, complete histories of bug fixes and potential sales opportunities. The system also acts as a workflow- and request-tracking tool, so support queries and other customer-related issues can't fall through the cracks: Outstanding requests remain on the appropriate desktop until they are resolved.

**T**he help desk grew out of a rudimentary Macintosh-based database of bugs that Amber Driesman, Gensym's manager of customer service, built in 1987, when the company was only a year old. (Before that, the company listed bugs in "a honking big binder full of paper," says Jim Allard, chief architect, core technology.) The database was not only very slow and hard to use, Driesman says, but it was on a separate platform from Gensym's primary one. The result, says Allard, was that many developers kept separate lists of bugs, fracturing any effort to maintain information centrally about technical flaws.

So in 1991, when Troy Heindel was hired as director of engineering support services, Driesman had a ready answer when Heindel asked her to name her department's most pressing need. "I said, 'I need a call-and-bug-tracking database,'" Driesman says. "He said, 'OK,' and just ran with it."

When choosing the help desk's technological components, Heindel faced not only the fiscal restrictions typical of a small company but also time constraints. The customer support group was growing quickly, and the company needed to hire a lot of help or get the new soft-

ware up and running. So, Heindel decided to build the help desk using Gensym's own G2 software, a graphical, object-oriented environment for building and deploying intelligent real-time systems. Not only was the product's price unbeatable, but Gensym's employees were familiar with it. By April 1992, he had a quick-and-dirty version that addressed Driesman's basic needs. But Heindel says the original request turned out to be just the first sprout in what would turn into a very large beanstalk.



**AMBER DRIESMAN (l.), TROY HEINDEL and ELIZABETH LANG:** *The original version of the help desk system was just the first sprout of what would grow into a very large beanstalk.*

## DEFINING VALUE

By spreading the customer service function throughout the company, Gensym's integrated help desk program increased the responsiveness of technical support, improved information sharing internally and cut support staffing costs.

## ANATOMY OF THE SYSTEM

**SOFTWARE:** The help desk is a custom application that runs in Gensym's G2 environment. Users access the help desk through Gensym's Telewindows front-end software. The relational database is Oracle7 from Oracle Corp. The servers run either SunOS or Solaris operating systems, both from Sun

Microsystems. Internal fax software is Silicon Graphics' FlexFax.

**HARDWARE:** The help desk and Oracle7 run on Sun Sparcstations. Client desktops are 486 or Pentium-based PCs, as well as some Unix and OpenVMS users.

**NETWORK CONNECTIVITY:** Provided through TCP/IP, DECnet and Winsock on PCs. Remote access is through Telebit NetBlazer PN running PPP at 14.4 Kbps over standard analog telephone lines, 64Kbit ISDN lines and Cisco 2501 for frame relay.

"We realized that what we really needed was a means to track all customer issues, not just bugs," he says.

So, Heindel teamed with Allard, Driesman, co-developer Elizabeth Lang and several others to analyze Gensym's customer support processes. They realized that Driesman's group was not the sole keeper of customer information. What about the sales team, which had firsthand knowledge of what customers would like to see in future Gensym products? The development team would love a reliable source for such information. The production and licensing department was another prospective user. P&L created the authorization codes necessary for

grade, in March 1995, finally brought together all the major users of customer information, Tarrant says. Today, a typical day on the help desk might work something like this:

A member of the customer support team is tracking a problem that a customer recently called in. She's sent the pertinent information electronically to product development, and now she uses the system's query function to pull information related to this particular problem and what's been done to resolve it. The two groups communicate almost exclusively by e-mail, thus insulating the development team from interruptions and creating a permanent history of the situation's resolution that can be referenced through the help desk.

Meanwhile, Allard sits down with the application to create a list of unresolved issues for an upcoming meeting on the current software release. Before the advent of the help desk, Allard verbally polled his developers once or twice weekly about the state of bug fixes and, as a result, his information was often out-of-date before the meeting day rolled around. Now, he pulls the information from the database in about 10 minutes, and he has an up-to-the-minute list when he heads off to the meeting.

Over in the sales group, one of the managers uses the help desk to check on the status of a software enhancement for a prospective client. He used the help desk to request the enhancement initially, ensuring that the idea landed on the desktop of the appropriate developer. The system's workflow-tracking abilities guarantee that the idea will remain active until the developer resolves it.

The sales manager also uses the help desk to request a temporary authorization code from production and licensing for a prospective client who wants to test-drive Gensym's software. Before this, the process routinely took several days of leaving phone messages and manually faxing the codes—a delay that left prospects feeling particularly uncharitable toward Gensym, Heindel says. P&L can now generate such codes and fax or e-mail them to the sales manager within minutes, all within

the confines of the help desk.

As the help desk has become an integral part of a day's work at Gensym, the company's employees have learned the importance of customer service at a companywide level, and Allard credits the system with helping teach that lesson. "It gives us a nice, clear-pond feeling," he says. "You can see all the way to the bottom, and not just the waves on top." **CIO**

Carol Hildebrand can be reached at [cjh@cio.com](mailto:cjh@cio.com).

## THE BOTTOM LINE

### GENSYM IN THOUSANDS

| INVESTMENT  | RETURN |
|-------------|--------|
| '92 \$417.6 | \$0    |
| '93 \$119.6 | \$0    |
| '94 \$119.6 | \$285  |
| '95 na      | \$385  |
| '96 na      | \$485  |

(na=not available)

#### PAYBACKS

- Operational efficiencies
- Increase in sales productivity

### FIVE YEAR ROI = 43%

*ROI = (total returns - recurring maintenance and operations cost) ÷ nonrecurring hardware, software and development costs.*

*Source: Chicago Research and Planning Group*

Gensym products to function and maintained a separate database of customer names and addresses. The team decided that the help desk should be linked to a company-wide database of customer information, from support issues to development requests.

Heindel brought in Sean Tarrant, manager of the corporate database, to build an Oracle database that would encompass all this information. The team has built several major versions of the application since its inception, adding new bells and whistles each time. The most recent up-

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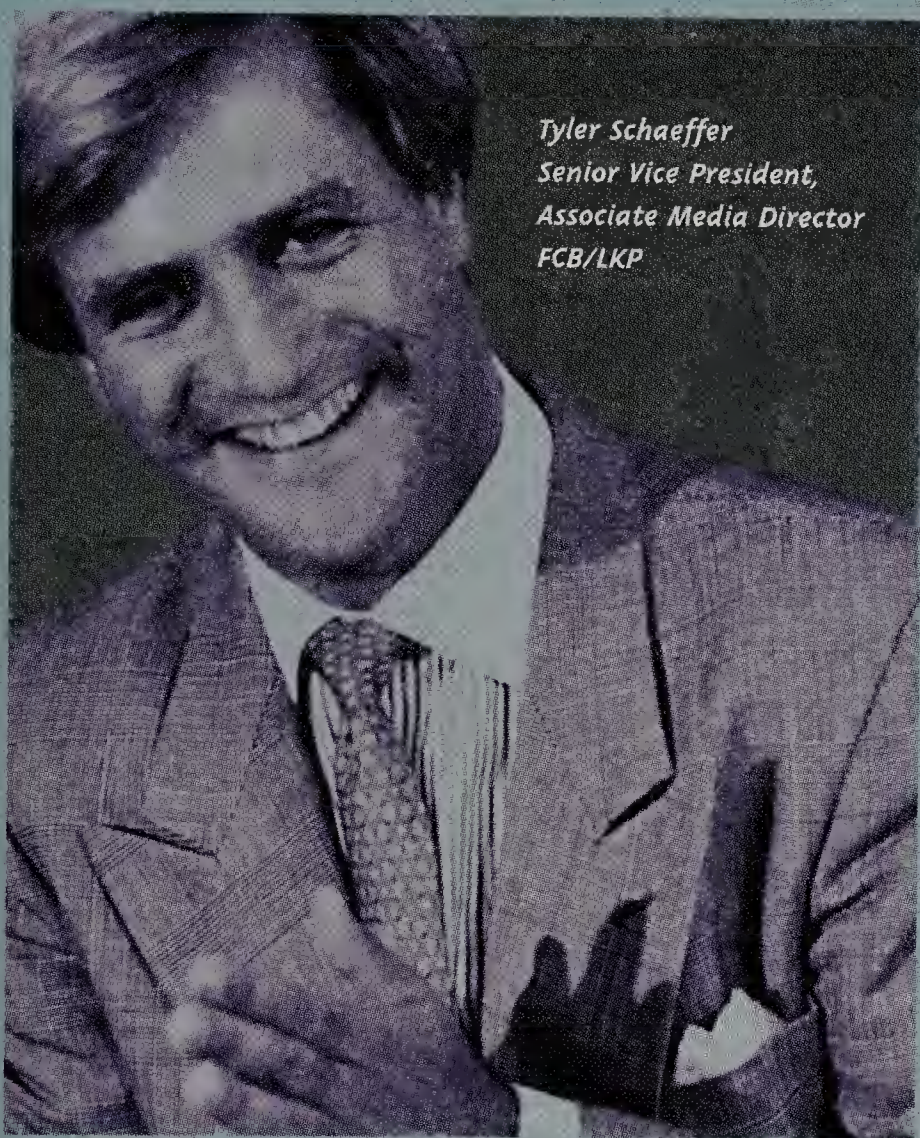
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*One person with a checkbook  
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TELOGY INC.

# Orders of Magnitude



Thanks to its new enterprise informa-

tion system, Telogy has slashed order fulfillment from 11 days to three while accommodating tremendous growth

BY PETER FABRIS

**L**ike a plucky point guard who makes up for lack of size with speed, finesse and smart ball handling, Telogy Inc. has carved a niche in the global electronic test equipment market—an industry dominated by large companies—by decreasing its cycle time and improving its knowledge of customers' needs. Its competitors include some "small companies," such as AT&T Corp., Hewlett-Packard Co., General Electric Co., Ford Motor Co. and Japan's Anritsu, says Sateesh Lele, senior vice president and CIO, with a wry grin. "We're proof that size is not a determinant of success."

Unlike its formidable competitors that sell or lease their own devices exclusively, the Menlo Park, Calif., company does not manufacture its own equipment (see "Pursuing the Perfect Pitch," *CIO*, June 1, 1994). Instead, Telogy focuses on refurbishing used equipment and recalibrating new devices for resale, rent or lease. Its engineering staff calibrates spectrum, network and logic analyzers, oscilloscopes, signal generators and other testing devices manufactured by many vendors for use in multiple industries. "We're like a systems integrator," Lele says. And with no need to push its own products,

Telogy can offer a rich menu of models and brands, providing an unbiased analysis of customers' needs in a market with a \$40 billion installed product base.

Founded in 1984, the privately held company now has 250 employees. Telogy's revenues (about \$100 million in 1995) are growing by 24 percent per year, far beyond the industry average of 4 percent.

Telogy's business strategy, which is unique in the electronic testing industry, accounts for much of its recent rapid growth. Company officials cite Telogy's enterprisewide reengineering effort as key to enabling this growth. The company's new three-tiered client/server system enables better internal process efficiency, both within and across various departments. Using a central database for all its information, Telogy has refined interdepartmental communication and coordination, improved customer service and reduced order fulfillment from an average of 11 to three days.

Perhaps the greatest impact is on the sales department, which is composed of three separate groups: outside sales, which meets personally with large customers; inside sales, which provides technical expertise; and telemarketing, which is responsible for cold calls.

With the previous paper-based price-quote method, a salesperson had to obtain quotes from three different places. Salespeople now use one database to access rent, lease and sell price quotes simultaneously via a laptop computer. And because all operational functions—sales, marketing, operations, finance and customer support—use the same

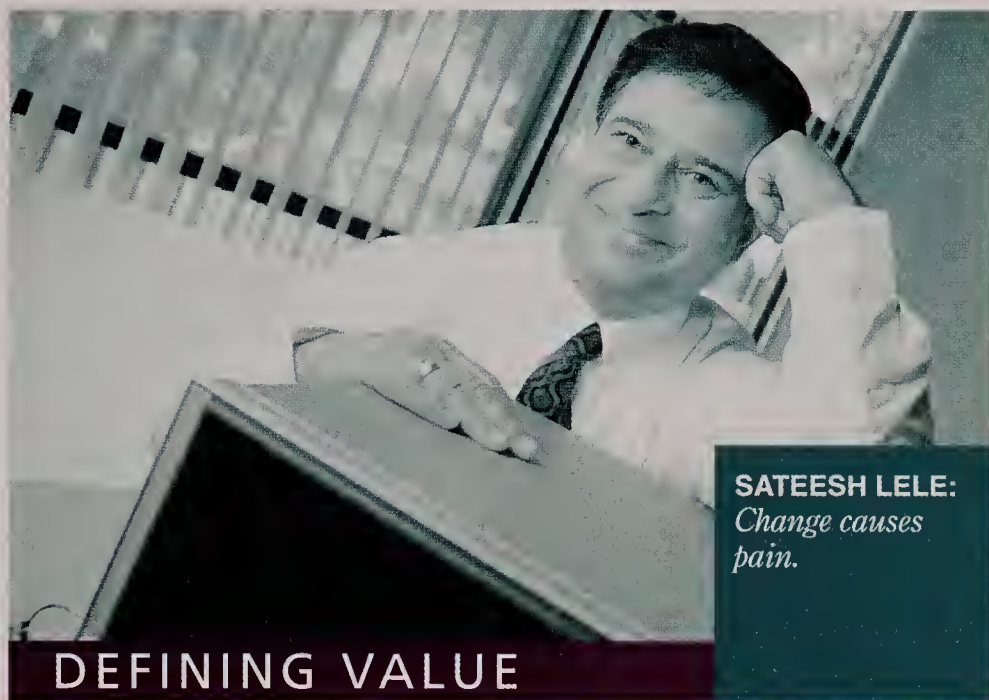
database, interdepartmental communication has greatly improved, says Mitchell Stewart, Telogy's former sales director. The need to communicate in writing and orally to cultivate and follow through on sales leads has been eliminated.

When sales enters an order, the system searches the inventory logs to determine if Telogy has the equipment in its warehouse. If the equipment isn't in the warehouse, the system will place a request with the sourcing department to buy it from an outside source. This capability enables Telogy to give accurate delivery date estimates, a critical issue for customers.

The three sales forces also use such key customer information to land new accounts and increase sales to existing customers. For example, a salesperson visiting ABC Farm Equipment in Iowa can access ABC's file from a laptop computer and see that Telogy's telemarketing group has called the company in the past. Although ABC has never placed an order with Telogy, the salesperson can note that the company expressed an interest in buying several products and can focus on those interests, saving time and demonstrating a desire to track the needs of its potential customers.

If ABC subsequently places an order, the salesperson might note that ABC is also interested in leasing 50 oscilloscopes in six months if a new product line takes off as expected. Inside sales at the Menlo Park office can then follow up.

With all departments working from the same database, salespeople have detailed account histories—including purchase history and technical specifications provided by Telogy's staff. The sales department can easily access key information to customize a sales pitch. And if a customer opts to rent equipment for a year and then buy it when the rental agreement expires, a salesperson has a record of the price originally quoted to the customer; that eliminates some awkward negotiating later on. "The biggest benefit of the new system is having the information at our fingertips," says Stewart. "Previously, we didn't know if we had already quoted a price to a customer or if they had bought



**SATEESH LELE:**  
*Change causes pain.*

## DEFINING VALUE

Using an enterprisewide information system, Telogy has refined interdepartmental communication and coordination, improved customer service and reduced order fulfillment from an average of 11 to three days.

something from us before."

The system is also an effective management tool that helps the sales department on pending big deals. "It enables a manager to pull up information about all the outstanding deals of, say, more than \$20,000 and talk to the salespeople to see what they could do [to close the sales]," Stewart says.

Equipped with filters and triggers, the system generates e-mail messages to appropriate staff for unusual cases. When an account needs an order to be filled quickly, managers can identify the order for fast turnaround. The system will put the order at the top of the "to do" list for each relevant department until it is completed. In addition, customers can check the status of their order by calling a voice-activated, 24-hour automated order-tracking system. "The service is like a bank's automated account-balance voice system, but it is unique to our market," Lele says.

The electronic testing equipment industry is fast paced, and keeping on top of new market trends is vital not only in order to adjust to customers' changing needs

## ANATOMY OF THE SYSTEM

**HARDWARE:** The system runs on Sun Microsystems Inc. Unix servers and terminals with a link to an HP 3000-based legacy system. Users access the system from Windows-based clients.

**SOFTWARE:** Telogy modified Aurum Software Inc.'s sales and marketing distributed client/server system and a manufacturing resource planning (MRP) II system from TXbase Systems Inc. The system uses a relational database from Sybase Inc.

**NETWORKING:** The networking functions are handled by a Unix TCP/IP system from Novell Inc.

## THE BOTTOM LINE

### TELOGY IN MILLIONS

| INVESTMENT | RETURN |
|------------|--------|
| '92 \$3.8  | \$3.15 |
| '93 \$1.0  | \$3.15 |
| '94 \$1.0  | \$3.15 |

#### PAYBACKS

- Increased sales
- Reduced inventories

### FIVE YEAR ROI = 397%

*ROI = (total returns - recurring maintenance and operations cost) ÷ nonrecurring hardware, software and development costs.*

*Source: Chicago Research and Planning Group*

but also to ensure that the company doesn't accumulate large inventories of outdated equipment. Telogy's new system enables management to quickly spot trends in the marketplace through analysis of new orders, enabling the company to acquire popular new products and cut back on those that are going out of favor.

Another key system feature is its links to foreign sites. Servicing customers throughout much of the world, Telogy needs to transfer key data such as market prices (which can fluctuate daily) to all sites. International headquarters in Brussels might sell an item at a price that is different from that in the United States. Now, price updates are instantaneous throughout the company. For sensitive information such as sales prices and inventory, Telogy uses private 800 numbers for domestic calls and private leased lines for international calls, and it is experimenting with putting marketing information on the Web.

**A**lthough the reengineering project has been a notable success, it didn't come without some pain, Lele says. "Any time you attempt an enterprisewide reengineering project, you're talking about major gut-wrenching change throughout the company," he says. Telogy's geographically dispersed workforce made for some extra challenges to the usual turf battles and employee resistance to such sweeping change. The

new Telogy is less hierarchical and less compartmentalized than it was in the past, with a culture that encourages more teamwork, he says. Such a major transformation naturally poses a threat to managers entrenched in the old ways. "There were some people who couldn't buy in to a flattened organization," Lele says. "There was some turnover."

Several factors, including Chairman and CEO Anthony Schiavo's strong support, helped make the project a success. In addition, Lele tapped some department "opinion leaders" possessing great influence with their peers to join the project task force. "You want to pick the person who the department can least afford to spare," Lele says.

Getting buy-in from key people at different levels made it easier to sell the project to the company as a whole, he says. To encourage cooperation at the executive level, the company tied bonus pay to the effective implementation of the reengineering initiatives and the integration of the new computer system within their departments. "If a VP is not getting with the program, one effective way to get his buy-in is to link his pay with the implementation of new processes," Lele says.

Partly to soften the project's impact, the company phased in new processes and system implementation over three years. The reengineering phase produced a number of "early wins" by streamlining operations well before the new computer system was ready to go, Lele says. "About 50 percent of the benefits came from this phase, before system implementation." Knowing that building its own system from the ground up would take too long and be impractical, the information systems department customized off-the-shelf software packages. It would have been nice if a complete system were available that met the company's specific needs, "but since we're such a complex business, the chances of buying an off-the-shelf plug-and-play system were zero," Lele says. "We picked a database [Sybase Inc.'s Sybase] to which a lot of vendors have ported."

Lele's team, augmented by contractors—including some programmers based in India, thereby enabling 24-hour system development at moderate cost—spent about a year on actual system development.

The company hasn't gotten around to naming the system yet; Lele says he may hold an internal contest to name it. Given the payoff so far, perhaps it should be called "Profit Maker." Clearly, it enables the pint-size Telogy to score big against the Patrick Ewings of its industry. **CIO**

*Peter Fabris can be reached at pfabris@cio.com.*



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# Endless Possibilities

Tools that simulate what-if scenarios show managers that a picture is worth a thousand words

BY DANIEL GROSS

**R**eengineering. It's more than just another new-fangled management theory. The best-selling concept has altered the way enterprises—both large and small and in industries as diverse as airlines and pharmaceuticals—are doing business. The overriding challenge is to improve quality, service, cycle time and cost. Reengineering may sound glamorous to some, but for those executives who are rethinking their business processes from the ground up, it can mean some heavy lifting.

The notion of business-process reengineering (BPR), a key component of reengineering, is causing consultants, engineers and managers alike to break down manufacturing and service processes into discrete components, view them in isolation and in relation to one another, and rejigger them accordingly. "How can I model best practices and then implement them in a reasonably flexible system?" asks Bobby Cameron, director of Software Strat-

egy Service at Forrester Research Inc. in Cambridge, Mass. "The ultimate solution is to create a business-process design, determine throughput and then use that information to generate the parameters that drive the application implementation."

But it's tough to carry out such extensive calculations on a basic computer spreadsheet or a pad of paper. Which is why consultants and IT specialists are turning to an expanding class of products called business simulation tools. "People have always analyzed what they do and searched for ways to do it better," says Frank Grice, a consultant with FMG System Solutions Inc. in Tampa, Fla. "These sophisticated new tools make that easier to do."

Business simulation tools provide IS executives with a means to breathe life into theories and test solutions without burning up the time and money needed to actually set up the processes. Many of the programs let users set up flowcharts to diagram the movement of resources through manufacturing or other business processes. "The idea of business simulation is to be able to model both the static and dynamic makeup of an organization or system," says Leon Stucki, president of Future Tech Systems Inc. in Auburn, Wash. Future Tech's Envision 5.0 allows users to transform flowchart objects into natural business objects and then store their relationships to one another in a repository.

As Stucki describes it, Envision, which costs about \$8,000, is a high-tech explanatory tool for the less technically literate. "You can pictorially represent paper going from desk to desk at a certain rate in a way that eliminates the need to explain the technology behind the process," he says.

But more than simply drawing



pictures, these business simulation tools help managers work out the kinks in processes before they actually occur on the assembly line. Process Architect, made by ViewStar Corp. in Alameda, Calif., lets Windows-based users design their own production lines, set the rates at which work packets enter the process and see the results immediately.

"The tool aids in determining transaction size or throughput and gives you a sense of where bottlenecks will occur," says David Ruiz, corporate director of product marketing at ViewStar. "Given a certain number of work packets or folders, managers can figure out how many operators and how many servers they'll need to keep up with that load," he says.

Russ Rogers, principal software engineer at Cabletron Inc. in Rochester, N.H., conducts very small-scale laboratory experiments that let him define how much memory a particular transaction will use. Based on the data, he then creates a model on Austin, Texas-based Scientific and Engineering Software Inc.'s SES/workbench simulation tool. "SES/workbench allows me to build simulation models of our products based on very limited testing in the laboratory," Rogers says. "Then we use the model to basically construct realistic scenarios in very complex environments. That helps us define internally in the development mode where our bottlenecks are."

All without having to write any code.

Computer simulation began in the early 1960s when only large industrial concerns such as General Motors Corp. and U.S. Steel Mining Co. had the technological infrastructure and computer know-how to create simulated models. While the origin of simulation tools lies largely in manufacturing, the word is spreading through financial, technology and even service industries.

"Previously, simulation was possible only through simulation lan-

guages that were difficult to use. You needed to create a program, build the model and debug it yourself, all of which was very time-consuming," says Dennis Pegden, president of Systems Modeling Corp., the Sewickley, Pa., maker of a business simulation tool called Arena (which costs \$13,500). "That's changed dramatically in the last decade," he says. "We now work with companies such as Burger King and Pizza Hut, where the

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**While the origin of simulation tools lies largely in manufacturing, the word is spreading through financial, technology and even service industries.**

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program, for example, can run scenarios showing the impact of introducing a new item to the menu."

Pegden uses the tool half the time for production and manufacturing. "The rest of the time, we use it all over the place," he says.

Terry Parrinello, a senior industrial engineer for Management Sciences at PPG Industries Inc. in Pittsburgh, uses Arena to develop capital appropriations and equipment modifications. The product permits users to go down to the language base and set up flowcharts or incorporate their flowcharts into templates with animation built in. "We've written a few things that let us look at inventories, staffing and production scheduling," he says. "We write a spreadsheet and export the data into the tool [Arena]. Then the model reads it and exports it back into a Microsoft Corp. Excel spreadsheet."

That essentially turns anyone who can use Excel—which is to say virtually every executive—into a systems modeler who can develop what-if scenarios, which are

the key to business simulation, both as an efficiency enhancer and a timesaver.

Business simulation tools can also prove to be effective marketing tools. When Bergmann Associates, an architectural and engineering company in Rochester, N.Y., was developing a proposal to rebuild a drawbridge over the Genesee River, it used Dallas-based Paradigm Simulation Inc.'s Vega tool to develop a three-dimensional animated proposal.

"A picture paints a thousand words. It's better if we can convey design changes in front of somebody instead of showing them plan sheets," says Matt Crider, manager of business administration and computer services at Bergmann Associates. The computer-generated animation proved far cheaper than traditional animation options, such as filmmaking, which can cost from \$350 to \$500 per second. And the result, which was presented to the New York State Department of Transportation, was more impressive.

Crider and his colleague, computer operations manager Charles Hixon, drew up a 30-minute presentation that included models of the bridge, the surrounding community, the highway approaches and various noise wall treatments. "We were able to present the model in a live interactive review session," says Hixon.

Still others approach business simulation tools from a systems angle. "Our notion has been that these business models are critical for a business enterprise and should be linked to the systems side," says Bob Seltzer, president of Meta Software Corp. in Cambridge, Mass., which makes WorkFlow Analyzer. "We have a direct connection with the modeling business process by capturing it into graphical form and then modeling it."

Seltzer's company is more concerned, he says, with connecting the simulation to a system rather than representing it graphically. "Instead of looking at the process purely from

a 'let's simulate something' approach, we are interested in connecting the simulation to somebody's system."

A recent Gartner Group Inc. survey of organizations interested in BPR tools—a subset of business simulation tools—showed that only one in four of those companies are using or thinking about using products with advanced simulation or animation capabilities. But as the higher-end tools come down in price and lower-end tools improve, the number of users should rise. According to the Gartner Group report, by 1998 more than half of all BPR projects will make use of some form of simulation or animation.

For the near future, most users will fall into three categories: internal consultants, charged with documenting their companies' organizational processes; external consultants who create new models to optimize processes for clients; and internal and external consultants who are specifically modeling workflow applications.

Regardless of who is using them, simulation tools should become more widespread as hardware and software costs drop and the technology improves. As companies ramp up, they face a bewildering array of choices. About 30 vendors offer products that range from \$600 to \$16,000, and some customized versions of these tools can cost up to \$60,000.

In a market that has no truly dominant players, the capabilities of these simulation tools vary greatly. At the high end, users can create animation to play out a business scenario. Paradigm Simulation's Vega runs on Silicon Graphics Inc. machines and costs about \$15,000. "Our approach with business simulation is to use real-time interactive graphics to depict scenarios, situations and data, and to allow users to interact with that data to get a better standing," says Mike Smoot, vice president for sales and marketing at Paradigm Simulation.

The highly sophisticated technology behind Vega was until recently considered out of reach to all but the most well-heeled customers for creating flight simulators in the aerospace and military industries. "The technology that used to cost tens of millions of dollars can now be delivered to users' desktops for \$30,000 to \$50,000. That has caused us to rethink how it can be applied in other areas," says Smoot.

High-end tools also come backed with service from vendors. "We

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**More than simply  
drawing pictures, business  
simulation tools help  
managers work out the  
kinks in processes before  
they actually occur on the  
assembly line.**

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have a full consulting and training organization," says Amy Spellmann, manager of consulting and training services at SES. "SES/workbench is a fully customizable tool to individual problems, but we also have models that are prebuilt."

At the low end of the market are products such as Imagine That Inc.'s Extend + BPR—which sells for \$695—and Scitor Corp.'s Process Charter, which sells for \$990 and runs on Windows. Process Charter is the offspring of CASE tools developed by the Menlo Park, Calif.-based Scitor. Process Charter allows users to conduct process analysis and simulation as well as set up flowcharts. And while it has fewer bells and whistles than more expensive products, it does allow for graphic representation. For example, it includes an icon or box that will turn red to indicate sufficient resources.

Companies such as Scitor are helping to democratize business

simulation tools. "We see a widespread appeal, even to some restaurant owners, who have certain times of the day when they know they're going to have a huge number of customers," says Julie Seipp, marketing manager at Scitor. Even small coffee shops may one day use business simulation tools to determine the frequency with which to refill coffeepots.

Some commercially available business simulation tools have been developed by consultants who couldn't find adequate accessories in the marketplace. "We got into it kicking and screaming due to a dearth of appropriate tools," says Nathaniel Palmer, product marketing manager at Delphi Consulting Group Inc., which sells its Workflow Factory business-process modeling tool for \$595. The tool, which Delphi created for proprietary use, proved so popular among clients that Delphi began to market it.

Others provide simplicity and flexibility. "We're able to take the Envision tool and tailor it to meet the exact in-house methodology," says consultant Grice. "It is the only tool that allows me to shape the tool to what I do instead of the other way around. And I find that significant. I can tell the tool to capture this data with that object and represent it that way."

Although some users and creators of business simulation tools make grand claims for their products, they are, at this point, far from a panacea. The garbage in, garbage out concept certainly applies in this situation. When using these tools, users must make sure the information and scenarios they plug into the programs are accurate and sufficiently realistic.

"To do BPR, you must visualize a process and then create an intuitive visual representation that is comprehensive to both the analyst who draws the process and the end user," says Palmer. 

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*Daniel Gross is a freelance writer based in New York. He can be reached at dangross@panix.com.*

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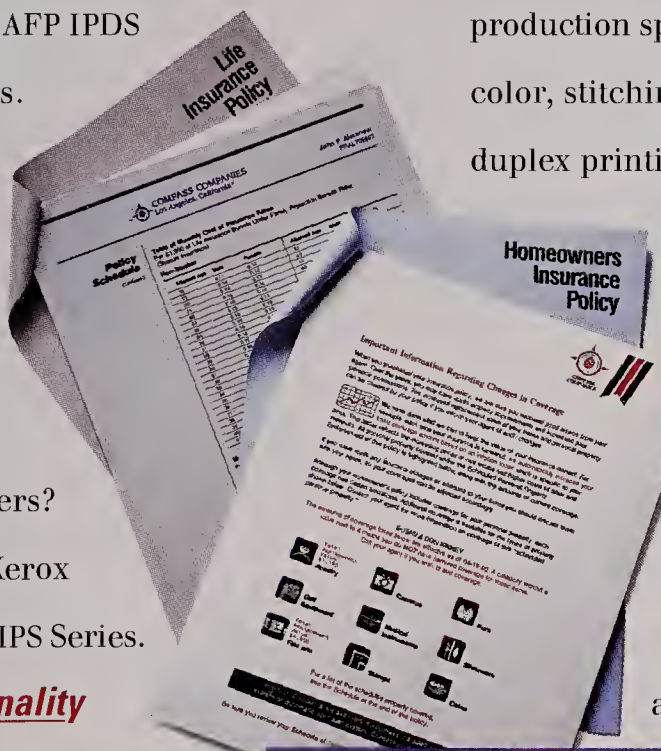
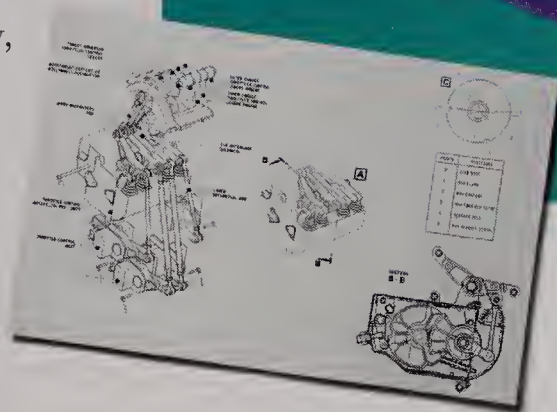
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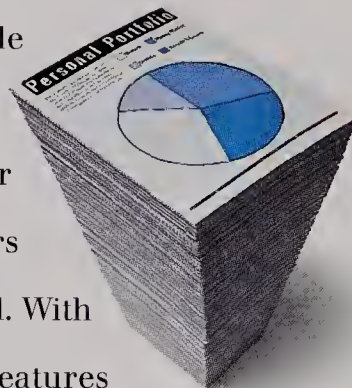
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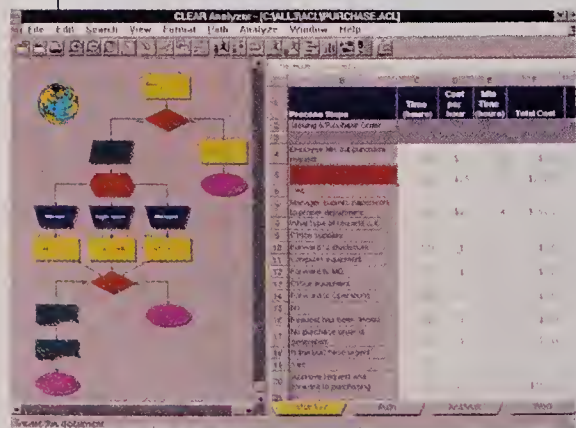
## What If...

**A**nalyzing business processes with conventional spreadsheet and flowchart tools can be time-consuming and complicated. Graphically based flowcharts are often clumsy, requiring users to drag and drop information manually. But now managers can chart and examine business processes automatically with Clear Software Inc.'s Clear Process, a Windows-based process management tool.

Combining flowcharts with a Microsoft Corp. Excel-compatible spreadsheet in a single desktop package, Clear Process gives managers an opportunity to analyze the steps taken to complete a job. Unlike conventional flowcharts, Clear Process is text-based, so users type information in outline form, and the program converts it into easily interpreted charts and graphs.

Clear Process enables users to perform activity-based costing, examine all possible paths and simulate what-if scenarios with the click of a mouse. If a certain flow path appears too costly or time-consuming, the program lets users evaluate alternatives.

IS professionals will find Clear Process helpful in auditing and eval-



uating internal control procedures, including programming and technical systems, as well as administrative procedures used in accessing, updating and modifying data.

Network versions are also available. For more information, call Clear Software at 617 965-6755.

## On the Go

**E**xecutives on the run now have a new device to help them keep track of all the details of their busy lives. Hewlett-Packard Co.'s HP OmniGo 100 handheld organizer weighs in at 11 pounds and is small enough to fit into a coat pocket. It combines the convenience of a pen and the familiarity of a keyboard with a screen that allows for horizontal or vertical display.

The organizer enables customers to track daily appointments and expenses, take notes, organize addresses and telephone numbers, and compute financial information with a built-in HP calculator and financial tools. Other features include a "jotter" application to jot down notes and organize them later; a graffiti handwriting system for handwriting recognition; drawing, spreadsheet and database capabilities; and a world-time program for locating cities around the world and obtaining time and city information.

Users can also choose from a host of accessories that work with the HP OmniGo 100, such as Intuit Inc.'s Pocket Quicken and HP OmniGo 100 Connectivity Pack, which includes a cable to allow simple connection to a Windows-based PC. The HP OmniGo 100 organizer can also be connected to a SkyTel Corp. 2-Way pager to transmit messages wirelessly to other SkyTel 2-Way users.

The HP OmniGo 100 runs on Geoworks' Geos operating system and user interface technology and costs approximately \$350. It is available through a variety of retail outlets, mass merchants, and home office and PC/peripherals channels, including computer and consumer electronic superstores. For more information, call HP at 800 443-1254.



## Planet of the Apps

**P**artitioning applications across client/server architectures can multiply management headaches. Information systems watchdogs must not only monitor network and hardware health but spot trouble in each of the partitioned application pieces and in the partitions themselves.

While there are a number of management tools for networks and hardware, there are fewer tools for managing the applications themselves. An IS department's best options are either to build its own alerts and event triggers during development and to design a console to monitor them or to try the add-on management utilities from client/server development tool vendors, the latest of which is Unify Corp.'s AppMan, a management adjunct to its Vision application development tool.

Vision has always been able to build monitoring and diagnostic features into its applications but until now wasn't able to report that information. AppMan solves that problem. AppMan's intelligent agents pick up on 400 events built into Vision-created applications, such as server failure or out-of-memory conditions. AppMan not only notices the events but pinpoints their cause and location of the platform, node or line of code. Agents also monitor end-to-end application performance and assist with software distribution and security.

AppMan's alerts and diagnostics are sent directly into the console windows of products such as BMC software Inc.'s Patrol, Tivoli Systems Inc.'s Tivoli/Enterprise Console, Hewlett-Packard Co.'s MeasureWare and PerfView and SNMP consoles. The company also offers a toolkit for creating custom agents for use with other management packages or proprietary systems. Unify charges \$1,995 per platform per site, regardless of the number of application users. The San Jose, Calif., company can be reached at 408 467-4500 or via its World Wide Web page at <http://www.unify.com>.

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**Editorial, Advertising and Business Offices:** 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208, (508) 872-0080. **Postal Information:** CIO (ISSN 0894-9301) is published semi-monthly; monthly in July and August; and as a combined issue December 15/January 1 by CIO Communications Inc., 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. Second-class postage paid at Framingham, MA, and at additional mailing offices. **Reprints:** Copyright 1996 by CIO Communications Inc. All rights reserved. Reproduction of material appearing in CIO is forbidden without written permission. Send all reprint requests to Permissions Editor, CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. **Photocopy Rights:** Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CIO for users through the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Massachusetts 01970. Please specify: ISSN 0894-9301. Permission to photocopy does not extend to contributed articles followed by this symbol: †. **Subscriptions:** Address inquiries to CIO, 492 Old Connecticut Path, P.O. Box 9208, Framingham, Massachusetts 01701-9208. CIO is free to qualified information executives. To all others the one-year basic rate is \$98 for U.S. and Canada, \$110 for foreign countries (payable in U.S. funds only). The single copy price is \$8. Please allow 4 to 6 weeks for new subscriptions to begin. **Change of Address:** Please fax a copy of current subscription label along with new address to (508) 872-0618. Allow 4 to 6 weeks for change to take effect. **Postmaster:** Send change of address to CIO, P.O. Box 489, Northbrook, Illinois 60065-9816.

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# Found Money

**By providing access to timely information, a client/server-based planning system lets Arizona Public Service recover millions in lost revenues**

**D**owntime is a necessary—and expensive—evil at Arizona Public Service (APS), the state's largest public utilities provider. Like all companies that operate nuclear power plants, APS has to shut down operations at its triple-reactor Palo Verde Nuclear Generation Station. Twice a year, one of the three goes offline for refueling and maintenance. For each hour the reactor is down, APS loses \$50,000 in revenues—amounting to \$1 million per day in unrealized income. In addition, APS has to buy power from outside providers and continue to pay its employees. Consequently, trimming total downtime by even one day would add up to serious money.

During an outage, 50 field workers have to complete roughly 7,000 maintenance activities, each of which affects the outcome of the entire refueling project. Before 1992, outages lasted about 70 days, thanks in part to a project management system that featured legacy scheduling software running on a vintage IBM mainframe that couldn't provide real-time access to information. For example, suppose one worker has to take apart valves before another can inspect pumps for corrosion. If there's a problem disassembling valves, the pumps can't be inspected on schedule, which in turn can cause a chain reaction throughout the station. The only way for managers to identify—and head off—potential glitches is by reviewing status reports filled

out by employees in the field. Under the old system, the paper-based process of collecting and inputting data into status reports took eight hours. Because managers accessed data that was usually stale, they could never be sure that everything was running according to schedule. And because initial problems that went undetected could create serious bottlenecks later on, delays and lost revenues resulted.

What finally convinced David Blythe, senior project scheduler, to migrate to a client/server-based PC network was the \$1 million in annual processing costs incurred by the outage-planning unit. "It drove me nuts that I didn't have any control over my budgets, over these costs," says Blythe. "That's what kind of kicked me in the heinie to look into client/server tools."

Blythe began the hunt for client/server project management tools in March 1992. Ultimately, he chose Artemis International's Artemis Prestige for Windows because of its open platform and multiproject capabilities. Artemis Prestige runs over a new client/server PC network and works in conjunction with Powersoft Corp.'s Power-Builder Enterprise reporting tools.

Each of the 50 work sites at Palo Verde is now outfitted with an IBM PC clone that enables field workers to enter, access and update data in real-time. Summarizing this data into a status report now takes four hours, half the time previously required. By

having access to timely, accurate reports, management can concentrate on heading off potential problems instead of scrambling to gather status reports and perform damage control on activities that went awry. Prestige's multiproject capability summarizes individual activities for managers and provides specific, customized reports to field workers.

By November 1992, the system was already paying dividends. In that year's final outage, APS saved \$4.5 million by refueling reactors in 67 days, three days ahead of schedule. But it was in March of 1993—when the system was fully implemented—that APS began to realize the biggest bang for its buck. Since then, each of the nine successive outages has been shorter; the last shutdown in 1995 required only 52 days, which amounted to \$30 million in reduced expenses and earned revenues. Although Blythe does not anticipate additional streamlining, the current time savings more than justifies the project's \$500,000 price tag.

APS continues to seek ways to improve its operations, especially in light of imminent deregulation and increased competition. "We're off to a good start," Blythe says. "We've got the software and hardware tools in place and now we have to figure out how to simplify the way we do business." —Jennifer Bresnahan

## VITAL STATISTICS

**Organization:** Arizona Public Service, Phoenix

**Application:** Outage scheduling and planning system

**Technologies:** A wide area network of 386 and 486 IBM PC clones linked with a Microsoft SQL database server running Windows NT; Artemis International's Artemis Prestige for Windows project management software runs on desktops

**Scope:** Fifty employees at the Palo Verde Nuclear Generation Station in Palo Verde, Ariz.

**Sponsor:** David Blythe, senior project scheduler

**Objective:** Reduce operating costs and maintain service levels by providing management and field-service employees with real-time outage scheduling and status reports

**Payoff:** Reduced outage time by an average of 10 days, adding \$10 million to the bottom line; reduced mainframe processing costs by \$800,000 annually

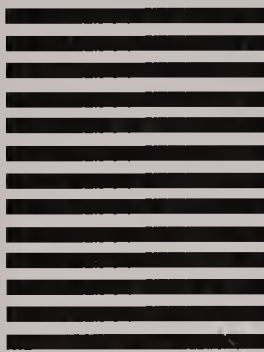


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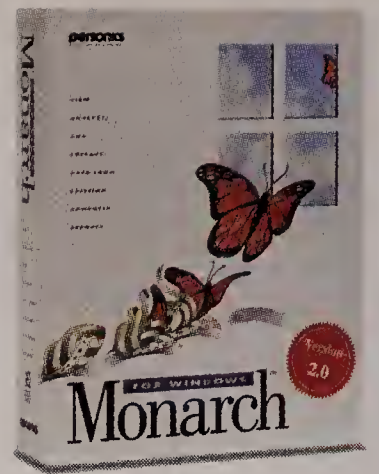
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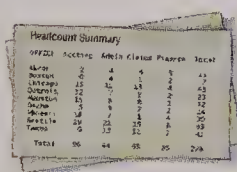
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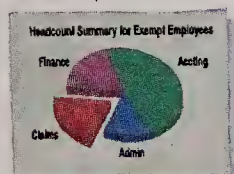
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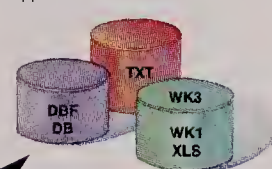
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| Bollinger            | 09/30/91            | \$51,315    |
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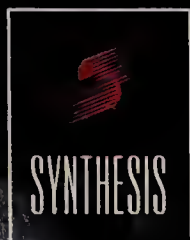
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